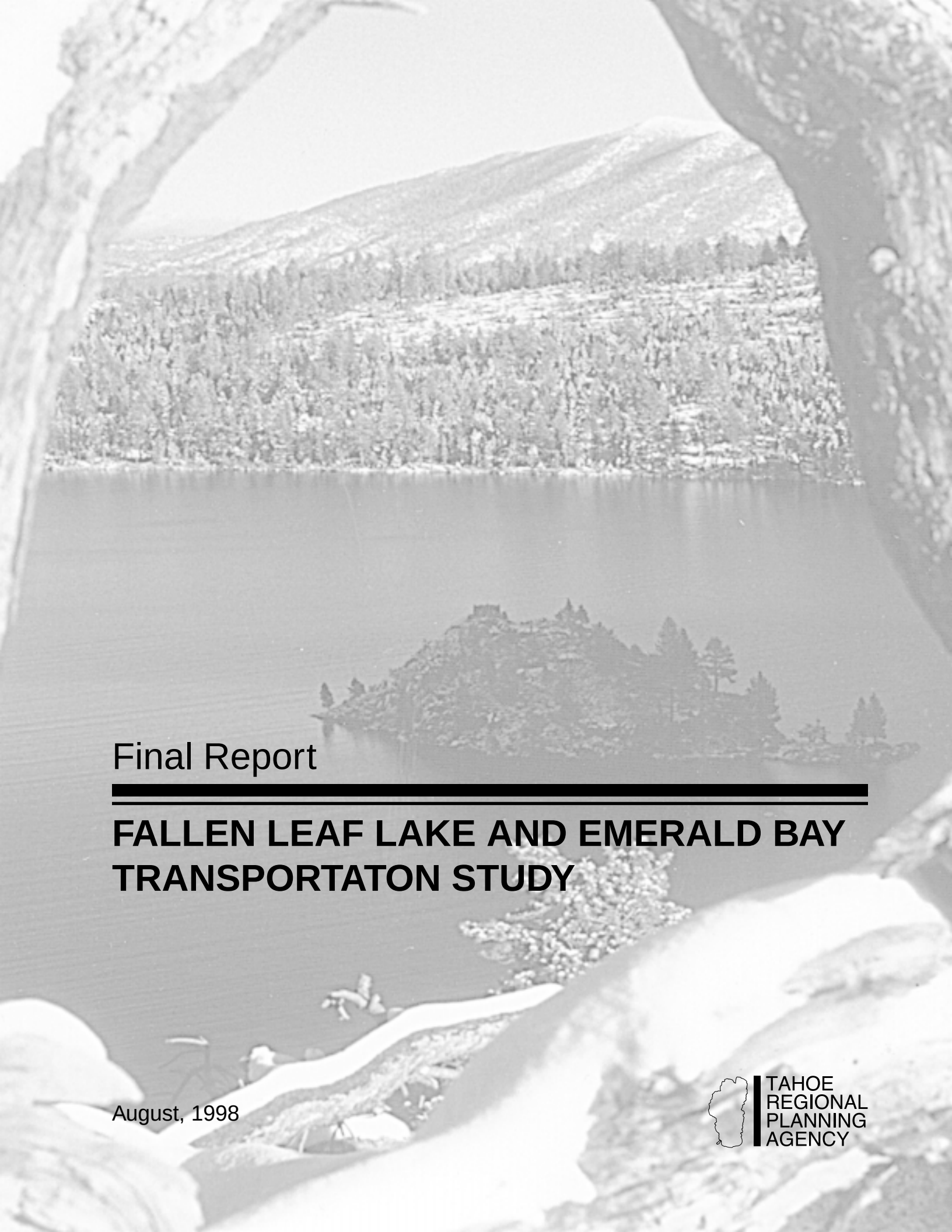

Final Report

FALLEN LEAF LAKE AND EMERALD BAY TRANSPORTATON STUDY

August, 1998

TAHOE REGIONAL PLANNING AGENCY

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Introduction and Purpose

Fallen Leaf Lake and Emerald Bay are two popular recreational destination spots within the Lake Tahoe Basin (see Figure 1: Regional Location Map, page 4). Both destinations are accessed primarily from California State Highway 89 that runs north to south along the west shore of Lake Tahoe. This study identifies transportation problems that are unique to each location and proposes and evaluates various alternatives designed to improve transportation in these locations. The alternatives include elements involving transit, parking management, signage, construction of parking facilities, and waterborne transportation. The alternatives are described following a description of the setting, the perceived transportation problems facing these two areas, and a summary of gathered data. Following that, the alternatives are analyzed according to established criteria.

Recently, the Lake Tahoe Transportation and Water Quality Coalition, with membership interest representing the environment, business, and government, began planning to address transportation, use, and parking along the SR 89 corridor from South Lake Tahoe to Tahoe City with emphasis on the scenic and recreation attractions along the corridor that include Fallen Leaf Lake and Emerald Bay. This study includes alternatives that are analyzed to address the perceived and measurable transportation problems in these two study areas. To the extent that the Coalition is investigating the various corridor and planning issues, this study is an initial piece of that effort. Implementation or selection of a preferred alternative from this study is not suggested until an overall implementation plan for the SR 89 corridor is coordinated with the efforts of the Coalition. In addition, this study is not a plan and does not meet the environmental review requirements for implementation for many of the alternatives.

While this study focuses on Fallen Leaf Lake and Emerald Bay, impacts from the uses along the Highway 89 corridor from the South “Y” (the intersection of S.R. 89 and U.S. Highway 50 in South Lake Tahoe) to Meeks Bay were considered in the development and implementation of the alternatives. In addition, the operational needs (funding needs, management) for transit service, parking management, and related concerns have been identified where possible.

In this study, Fallen Leaf Lake and Emerald Bay are discussed separately. When appropriate, linkages between the two locations are established. Two locations, which appear vital to both study areas, are the attractions at nearby Camp Richardson and Tallac Visitors Center. Incorporation of this influence area to both study areas is accomplished in the discussion of alternatives.

This study was funded by the State Planning and Research Grant, Technical Planning Assistance (TPA) Program Element, through the Caltrans, Mass Transportation Program, Office of Transit Planning and Policy. The Federal Transit Administration (FTA) provided such funds under the Federal Transit Laws. The FTA/TPA Program provides discretionary funding for the preparation of public and intermodal transportation planning projects in accordance with the provisions of the program in primarily nonurbanized areas of the State of California. Funding was provided on a 80% federal and 20% non-federal local match basis. On March 31, 1997, funding for the federal portion of the study was approved for $18,707 and $4,677 for the local match for a total of $23,384.

Fallen Leaf Lake

Setting

Fallen Leaf Lake (see Figure 2: Fallen Leaf Lake Map, page 5), located just to the southwest of Lake Tahoe, is surrounded on three sides by steep ridges and a level, densely vegetated area along its northern edge. The valley it sits within was cut by glacial action and as the ice retreated, glacial moraines and unsorted glacial till were deposited by the glaciers' bulldozing action. The resulting basin formed is approximately two miles wide and four miles long. Although numerous intermittent streams drain into Fallen Leaf Lake, the primary perennial drainage into Fallen Leaf Lake is from Glen Alpine Creek on the south end of Fallen Leaf Lake. At the north end of the lake, the US Forest Service operates a release gate at the Baldwin Dam. At this point, Taylor Creek begins, ultimately draining into Lake Tahoe.

The relatively steep nature of the mountainsides surrounding Fallen Leaf Lake as well as the attraction of the lake itself has resulted in development close to the shoreline of Fallen Leaf Lake. Aside from a US Forest Service Campground and several homesites on the north end of the lake, much of the development is concentrated along the southern portion of the lake. Along the west shore of Fallen Leaf Lake, accessed by Cathedral Road, there are other homesites, however these sites are cutoff from the more heavily utilized eastern and southern shores. This study will be addressing use on the eastern and southern shore.

With its steep mountainsides, various wetland areas, exposed rockier areas, and forested areas, Fallen Leaf Lake provides a variety of habitat types necessary to support a relatively abundant wildlife population. The low level of development and proximity to the Desolation Wilderness Area is also supportive. One of the attractions of the area is the nearly intact, natural setting and the opportunities for wildlife viewing.

Uses at Fallen Leaf Lake are organized into several main areas (see Figure 2: Fallen Leaf Lake Map, page 5). From north to south, the first use encountered is the US Forest Service operated Fallen Leaf Campground. Adjacent to the campground are numerous trails that provide hiking opportunities for campers and others who park nearby to utilize the trails. Moving south, development is sparse until near the intersection of Emigrant Road and Fallen Leaf Lake Road. Primarily from this point south, many parcels are developed with summer residences and homes. At the very southern end of Fallen Leaf Lake, there is a marina and general store with associated parking. Continuing to the southwest shore, one encounters Stanford Camp, a collection of cabins and retreat area for alumni and other associated activities of Stanford University. Further to the south are more summer cabins and a parking area for use of the Lilly Lake, Glen Alpine Falls, and Desolation Wilderness Area.

Even though Fallen Leaf Lake is relatively close to urbanized South Lake Tahoe, the sense of the area and attraction is its tranquillity, low-intensity development, and rustic mountain nature. Many of the developed summer homes in the area date to the 1930s and some families have continued to visit the area since. Typical activities in the area are hiking, boating, water-skiing, fishing, swimming, bicycle riding, and general sightseeing.

Three roadways enter the Fallen Leaf Lake area, all of which are closed in the winter months. One access, Tahoe Mountain Road enters the Fallen Leaf Lake basin over the steeper eastern portion of the basin. The narrow and twisting roadway at points will not allow two cars to pass each other going in different directions. Ultimately it ends in a "T" intersection with Fallen Leaf Lake Road. Fallen Leaf Lake Road enters the basin from SR 89 from the north. This road is of varying widths, generally narrowing as it travels south along the eastern shore of Fallen Leaf Lake. At many points, the road width is inadequate for two vehicles to pass each other. The remaining entry road to Fallen Leaf Lake is Cathedral Road that enters from SR Highway 89 and follows the west shore

of Fallen Leaf Lake. This study will concentrate on transportation issues along Fallen Leaf Lake Road.

Along Fallen Leaf Lake Road, travelers do not get a glimpse of Fallen Leaf Lake until near the intersection with Emigrant Road. For the public, access to the lake itself is limited to the north and south portions of the lake. In the northern portion visitors' knowledge of access to the lake via the hiking trails adjacent to the US Forest Service Campground is minimal. By contrast, southern lake access is clearly identified by the marina, the parking areas, and proximity to the lake itself. Access to the extensive hiking opportunities of Desolation Wilderness is available south of the lake at the Lily Lake parking area and Desolation Wilderness trailheads.

Emerald Bay

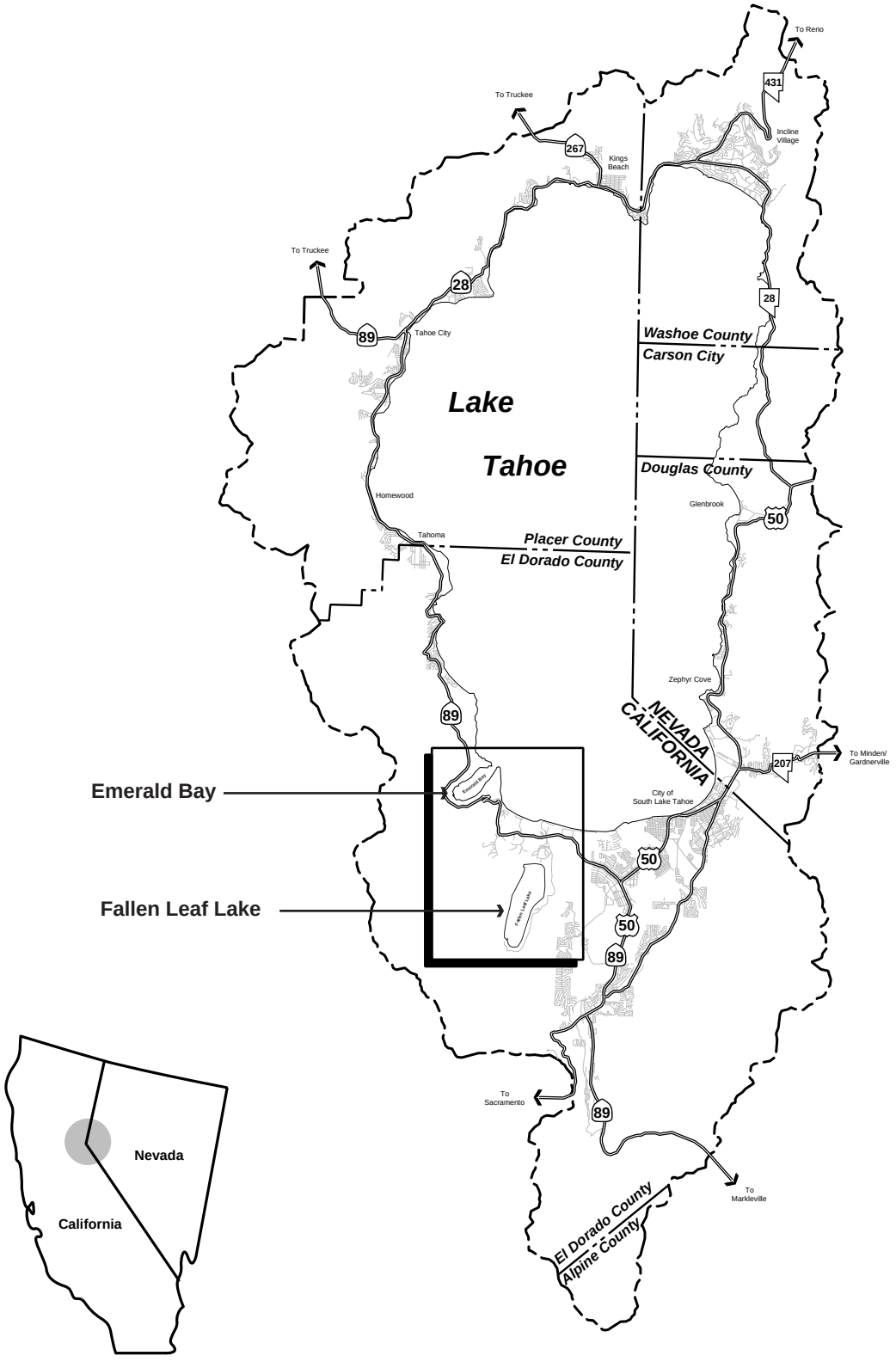
Setting

Emerald Bay, like Fallen Leaf Lake, is a basin scoured out by mountain glaciers (see Figure 3: Emerald Bay Map, page 6). When the glacier retreated, a steep moraine was left on the northwest and southeast sides. Unlike Fallen Leaf Lake, which is cutoff from Lake Tahoe, Emerald Bay is a part of Lake Tahoe (the shallow water near the mouth of the bay indicates how close Emerald Bay came to becoming a separate lake). The mountains surrounding Emerald Bay are steep and relatively unstable. Rockfalls are a common occurrence and in the winter, the danger of avalanche is high. State Route Highway 89 that travels through the area is often closed during the winter due to the avalanche danger and snow removal conditions.

Aside from SR 89, a campground, a historic estate, and recreational trails, the Emerald Bay area is undeveloped. From near lake level to along mountain and ridge tops, the extremes of elevation in the Emerald Bay basin create numerous habitat types and wildlife is relatively abundant in the area.

Land ownership in the Emerald Bay area is split between California State Parks and the US Forest Service (see Figure 3: Emerald Bay Map, page 6). Emerald Bay State Park primarily consists of the land downslope of S.R. Highway 89. Within the State Park, are Upper and Lower Eagle Point Campgrounds, the Vikingsholm estate, Fannette Island (in Emerald Bay), a boating accessible campground, and numerous hiking trails. Parking is provided in two areas; parking at Inspiration Point on the southeastern ridge and parking at the Vikingsholm Parking Lot located just off the highway at the deepest point of the bay. The US Forest Service manages the remaining land that primarily extends above the highway. A parking lot is provided at Eagle Falls that is used by those accessing the falls or the Desolation Wilderness area. In addition, the US Forest Service provides leases to several recreational summer home dwellings on the northwest side of Emerald Bay.

Recreational use in the Emerald Bay area is extremely high. In the vicinity are US Forest Service managed Eagle Falls Picnic Area/Trailhead, Bayview Trailhead, Inspiration Point (a vista viewpoint), and the California State Parks managed Vikingsholm estate, Vikingsholm, Eagle Falls, and Rubicon Trailheads, and the Eagle Point Campground and Boat Camping Area. The S.R. Highway 89 corridor is used to access all but the boat camping area. Due to insufficient parking supply along this corridor in the attraction and trailhead areas, many visitors are forced into parking in undesignated areas thus impacting safety, aesthetics, and water quality.



TAHOE REGIONAL PLANNING AGENCY

Figure 1
REGIONAL LOCATION MAP

North

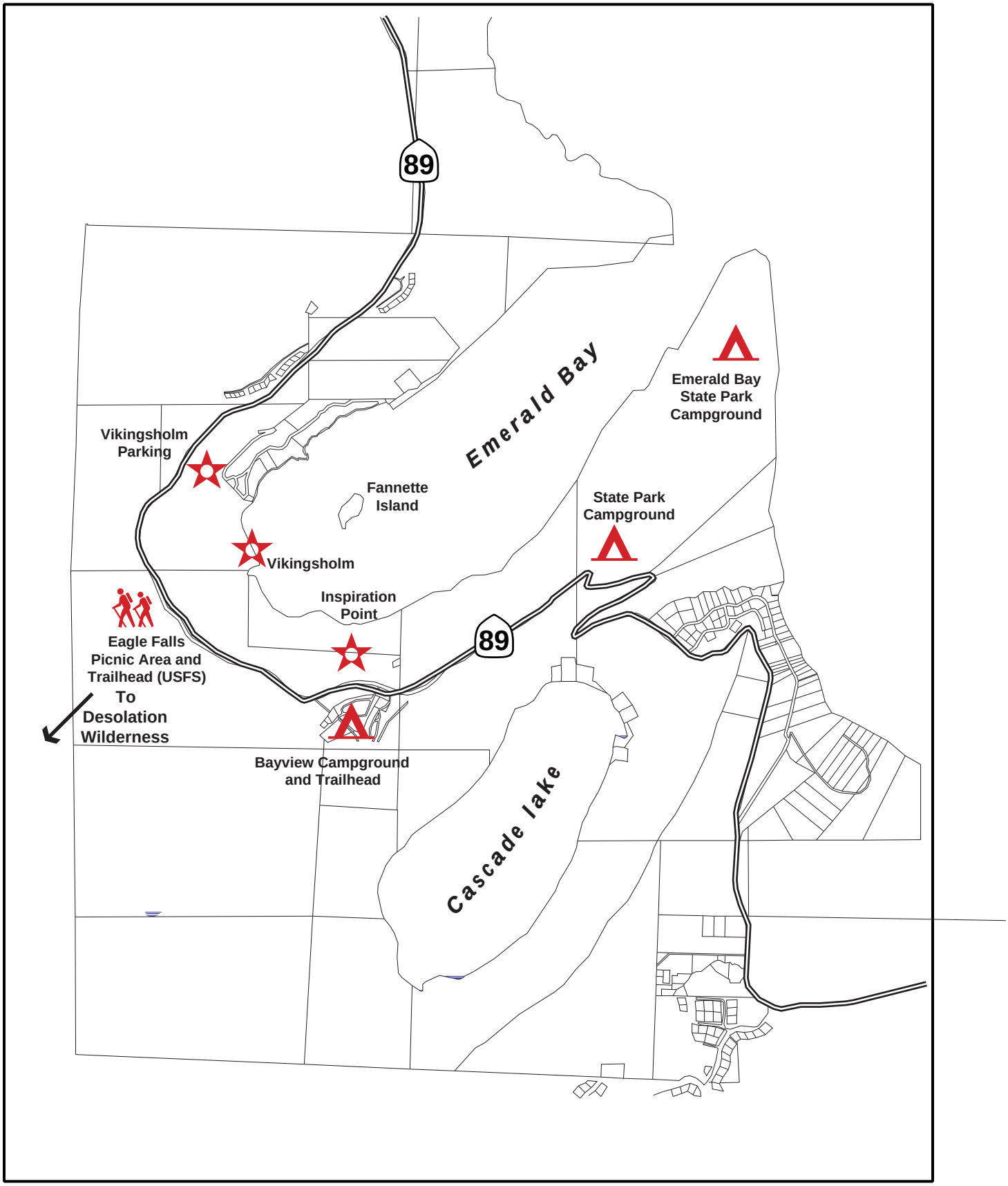
N.T.S

TAHOE REGIONAL PLANNING AGENCY

Figure 2
FALLEN LEAF LAKE MAP

North

N.T.S



TAHOE REGIONAL PLANNING AGENCY

Figure 3
EMERALD BAY MAP

North

N.T.S

Problem Identification

At both locations, transportation problems have been long recognized by Tahoe residents, visitors, and recreation providers. This study was developed to better understand the nature of the problems, identify various solutions, and evaluate these solutions in the form of alternatives. The data characteristics described previously are assembled below to identify the vital characteristics of potential transit operations. After a discussion of the problems identified for each location, the problems are developed into criteria that will be used to evaluate the performance of the alternatives considered in this study.

Fallen Leaf Lake

Like many locations within the Lake Tahoe Basin, the problems along Fallen Leaf Lake Road are experienced in the summer peak season (Fallen Leaf Lake Road is closed and unplowed during the winter months). Although the road is narrow for vehicle travel during off-peak times, the constraints of the road and parking facilities become apparent during June but especially during July and August. The data for this study was gathered during July and August to better understand how a transit system could function during these peak times.

An important step in attempting to assess and address the problems began in 1993; the Federal Highway Administration prepared a "Reconnaissance and Scoping Report for California Forest Highway 223, Fallen Leaf Road". In this report, the road was assessed for its continuing inclusion in the Public Lands Highway (PLH) program and for highway improvement needs. Fallen Leaf Road as covered by the program only refers to Fallen Leaf Road from its intersection with S.R. Highway 89 and Tahoe Mountain Road. The report recognized surfacing problems (potholes, cracking) and operational problems, especially the narrow, twisting section 1.5 miles north of the Tahoe Mountain Road intersection. In the report, the highway was determined to be near the end of its serviceable life and inadequate for current traffic, let alone the expected increases in traffic. In addition its function was not consistent with USFS management objectives nor was its repair within regular El Dorado County maintenance capabilities. The report recommended reconstruction utilizing design criteria that would widen the road over its present condition. Several alternatives were proposed which investigated reducing shoulder width and a range of other roadway improvements.[i]

Various public meetings were held to discuss this proposal and opposition to widening Fallen Leaf Road to Tahoe Mountain Road was very high from the seasonal residents at Fallen Leaf Lake. The belief was that widening the Fallen Leaf Road to that point would only encourage more traffic down the remaining portion of Fallen Leaf Road. Additionally, residents felt that a wider, smoother road would not mean a safer road, especially given the recreational bicycle use. Among the alternatives proposed, the most universally favored was the "no-action" alternative. Several respondents mentioned alternative solutions that should be pursued. These include shuttle systems, a parking area with access to the north side of Fallen Leaf Lake, and boat shuttles from a north end dock to the south end of the lake. Subsequent to those meetings, the plan for reconstructing the road wider was put on hold.[ii]

The resultant "no-action" on the project has spurred additional discussions between property owners and government land managers and regulators. In April 22 and June 3, 1996 meetings entitled, "Fallen Leaf Lake Transportation Issues and Opportunities Identification," many of the existing problems were discussed. Problems as expressed by residents of Fallen Leaf Lake fell into several distinct categories that are discussed below.

Vehicle Use Conflicts

Conflicts between vehicle use along narrow and twisting Fallen Leaf Road occur between automobiles, pedestrians, bicycles, mopeds, and larger vehicles, including recreational vehicles, commercial trucks, and vehicles towing boats or trailers. Bicyclists and their lower speeds force motorized vehicles around them, however, on-coming traffic may prevent passing, as do the many blind curves. In the narrower portions of the road, larger vehicles may preclude on-coming traffic movements. Traffic bottlenecks are created in particular situations, which occur more frequently during weekend periods. Sorting out the bottleneck is like unraveling a puzzle, taking several minutes of backing up and positioning on the available pullouts to resolve. In addition to the vehicle use conflicts witnessed among the existing traffic mix, emergency vehicle access is compromised by both the characteristics of the vehicles using the road and the road itself.

Traffic Volumes and Operational Problems

In many conditions, travel along Fallen Leaf Road is satisfactory, even given its narrow, twisting nature. The conditions in summer, however, involve peaking periods of relatively high use both for resident and visitor travel that can lead to situations where traffic flow is impeded. A worst case situation that has been described by some residents is a situation where a large truck is unable to pass by oncoming traffic thus causing traffic in both directions to queue up. This situation typically occurs in the narrow portions of Fallen Leaf Road. If volumes of traffic were lower, the opportunity to back up and position vehicles so they could pass would be possible in a matter of a few minutes. Instead, the situation described can cause backups lasting longer than twenty minutes according to Fallen Leaf Lake residents. The conflicting speeds of various modes of travel (automobile, bicycle, moped, large truck) also cause operational problems. The use of pullovers along the route increases as traffic volume increases. Correspondingly, travel times increase and speeds decrease.

Parking Supply

Parking at Fallen Leaf Lake is a mixture of formal, designated spaces as well as greater numbers of informal (unpaved) parking spaces. Location of both formal and informal spaces is not optimal relative to the demand for particular locations. Locations where demand exceeds supply has led to the creation and maintained use of informal parking. This situation, in addition to detracting to the intact natural state of Fallen Leaf Lake continues to harm water quality. As is common in many “secluded” parking locations, parking break-ins have been reported for both formal and informal parking locations. Beyond the parking locations discussed, there are some residences that have inadequate parking, especially when large groups of guests arrive.

Inadequate Signing

Many residents feel that conditions of the road not explained thoroughly enough to visitors. The thought is that larger vehicles (recreational vehicles) may choose not venture to the south portion of Fallen Leaf Lake if given adequate warning of the road conditions ahead. In some instances, residents have reported vehicles accessing the area that, in their opinion, should be restricted from gaining access. The lack of information about the roadway appears to be a contributing factor to the vehicle use conflicts and operational problems.

Viewing Lake Options

Several residents believe that many of the demands placed on the roadway are by those who simply wish to view Fallen Leaf Lake. At this time, unless visitors are aware of the opportunity to park their vehicle near the north end of the lake and walk to the lake, all visitors will see the lake only at the south end, having passed through the most congested and narrow portions of the roadway. The fact that the public does not have a ready view or access to Fallen Leaf Lake until it

has passed through the most narrow points of the roadway is thought by residents to be a contributing factor to the traffic volumes.

Resident and Visitor Experiences

The broadest category of comments that encompasses all the above problem areas is the combined effect these have on the experience of resident and visitors to Fallen Leaf Lake. Residents feel that relative to the capacities of the area, it is apparent that Fallen Leaf Lake is over utilized, thereby reducing the quality of the experience for many residents and visitors. The perception of crowdedness for the roadway and recreational uses appears to be higher for the residents than visitors, although the motivation for a quality experience is shared by all. To the extent that the above problems can be solved, resident and visitor experiences may improve.

From the same meeting, a variety of solutions were suggested. A number of these examined incorporation of a transit shuttle system plus some mechanisms for encouraging or requiring shuttle ridership. Examination and development of alternative solutions will examine several of the ideas proposed in the April 22 and June 3, 1996 meetings.

Emerald Bay

Transportation problems at Emerald Bay do not involve the complexities of Fallen Leaf Lake. The situation at Emerald Bay involves insufficient parking supply for the tremendous demand, and until recently with the Emerald Bay shuttle, no feasible way to access recreational sites except by private vehicle. For the purposes of this study, the Emerald Bay parking area involves the parking near the Bayview area, Inspiration Point, and parking along the road and in the formal parking areas for access for Eagle Falls and Vikingsholm. Together, these parking areas incorporate the impacted locations serving Emerald Bay.

Many of these parking areas are paved, however, use is so high that informal parking areas have been carved into locations where sufficient compacted soil exists or a road shoulder is wide enough to accommodate a parked vehicle. This has created a haphazard, chaotic parking scheme where vehicles arriving when parking is relatively full are forced to search for parking opportunities or improvise to meet their needs. Not only does this create some dangerous situations, especially for those parked on the narrow shoulder, it exacerbates water quality problems in those areas where parking occurs on unpaved surfaces.

During the 1997 survey summer, a shuttle system ($2/passenger) was initiated from Camp Richardson Resort. The total ridership on this shuttle for the season was 5,725 persons. When continued into future years, this is expected to increase, especially if the service is modified to better blend into existing and future planned transit services.

Also in 1997, the US Forest Service initiated a “fee demo” program at the paved lot at the Eagle Falls Trailhead. This program generated $40,000 in 1997. Fees were paid into a drop off container at the site. Parking surveys of this site associated with this study and by other observations noted that the facility was full throughout the peak of the late morning and early afternoon.

In the future, California State Parks will be completing a trail from Eagle Point Campground to the Vikingsholm Estate. When finished, a portion of the Eagle Point Campground may be utilized more as a day use area with the intent of relieving pressure on the Vikingsholm parking area. Additional plans of California State Parks include working with law enforcement to eliminate shoulder parking along SR 89 and include paid parking at Vikingsholm. The effect of these plans is included as an alternative in this study.

Data Collection

During the summer of 1997, data was collected to assess the problems and develop quantitative understanding of the transportation situations at Fallen Leaf Lake and Emerald Bay. Data collection was divided into physical characteristics, area activity characteristics, existing travel data, and traveler characteristics.

Fallen Leaf Lake

Physical Characteristics: Fallen Leaf Lake

Pavement Width: Location of Pullouts. Any transit service operating on Fallen Leaf Lake Road will have to contend with the narrowness of the road, which allows oncoming vehicles to pass only at specific pullout locations. To determine what portions of Fallen Leaf Lake Road south of S.R. Highway 89 provide opportunities for vehicles to pass (defined as a pavement width of 14 feet or more), measurements were made with a measuring wheel, starting on foot from S.R. Highway 89 and Fallen Leaf Lake Road intersection heading south. Potential pullouts where a passenger van could pull over and allow oncoming traffic to proceed (both pullouts along the road and driveways) were identified (see APPENDIX A: Table 24: Fallen Leaf Lake Roadway Pullouts). Based on this data, there are forty (40) potential pullouts (located away from a driveway) as well as thirty-three (33) driveways with adequate space for vehicles to pass on Fallen Leaf Lake Road. As the road narrows, the numbers of pullouts in the vicinity increase. Along areas where the road is wider, the need for pullouts is not as high. The ownership status of these pullouts (public vs. private) is unknown although Fallen Leaf Road south of Tahoe Mountain Road crosses through privately owned parcels through an informally established “prescriptive easement”.

Available Parking Spaces. The number of formal and informal parking spaces is identified by subarea for the Fallen Leaf Lake area (see Table 1: Fallen Leaf Lake Weekday Parked Vehicle Counts, page 11; and Table 2: Fallen Leaf Lake Weekend Parked Vehicle Counts, page 12). Formal parking spaces are those that are striped. Informal parking spaces were determined by using a measuring wheel to measure the length of shoulder available for parallel parking, and divided by 22 feet per space to estimate the number of spaces. For informal areas where drivers park head-in, the perimeter of the area was measured and divided by 10 feet per space. It was determined that the Fallen Leaf Lake area has a total of 290 parking spaces, consisting of 84 formal and 206 informal spaces. All of the formal parking spaces are located at either the Marina (39 formal spaces), Lily Lake (42) or Stanford Camp (3). Informal spaces are distributed from the north end of the area near State Route 89 to Stanford Camp, with 101 informal spaces at this parking lot, all the way to the formal parking area at the Lily Lake trailhead. Figure 4 and Figure 5 show the parking use by time of day.

Table 1: Fallen Leaf Lake Weekday Parked Vehicle Counts

Weekday

Location	Number of Parking Spaces			Vehicle Count by Hour											Max. Observed Usage	
	Formal	Informal	Total	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	Formal Spaces	Total Spaces
BIG LOT BY ENTRANCE	0	15	15	0	0	1	1	1	0	0	1	1	0	0	–	6.7%
AFTER CAMPGROUND ON LFT.	0	4	4	1	1	1	2	0	0	1	0	0	0	0	–	50.0%
P.O. ON RT. AFTER B	0	3	3	0	0	0	0	0	0	1	2	2	1	0	–	66.7%
TRAILHEAD RT. SD.	0	9	9	1	2	6	7	4	7	9	5	3	0	2	–	100.0%
TRAILHEAD LFT. SD.	0	8	8	0	1	5	4	4	2	5	3	2	4	2	–	62.5%
P.O. AFTER TRAILHEAD ON LFT.	0	4	4	0	0	0	0	0	0	0	0	0	0	0	–	0.0%
PARKING LOT AT MARINA	28	0	28	3	6	8	15	20	27	28	22	14	11	13	100.0%	3.6%
MARINA	11	9	20	9	8	9	6	6	11	15	18	20	13	17	181.8%	100.0%
CHURCH PARKING, ENTIRE AREA	0	12	12	0	1	1	4	3	0	1	2	3	2	1	–	33.3%
AFTER CHURCH LFT. SD.	0	3	3	0	0	0	1	1	1	1	0	0	0	0	–	33.3%
P.O. LFT. SD.	0	2	2	0	0	0	1	0	0	1	1	0	0	0	–	50.0%
ACROSS BRN. HS. @ WATERFALL	0	2	2	0	0	0	0	1	1	2	1	1	0	0	–	100.0%
RT. ACROSS FROM FALLS - LFT. SD.	0	10	10	0	0	0	0	2	3	5	3	3	5	2	–	50.0%
P.O. AFTER WATERFALL - RT. SD.	0	3	3	0	0	0	0	2	1	1	0	0	0	0	–	66.7%
RT. AFTER P - LFT. SD.	0	2	2	0	0	0	0	1	0	0	0	1	1	0	–	50.0%
RT. AFTER Q - LFT. SD.- MOST PARKED	0	3	3	1	1	1	1	3	1	1	1	3	2	0	–	100.0%
LARGE P.O. - LFT. SD. UP FROM R	0	0	0	0	0	0	0	0	0	0	0	0	0	0	–	–
LFT. SD. CLOSE TO BRIDGE	0	2	2	1	1	1	1	1	1	1	1	1	1	1	–	50.0%
LFT. SD. NEXT TO BRIDGE	0	8	8	0	0	0	0	0	0	0	0	0	0	0	–	0.0%
PARKING LOT @ LILY LAKE	42	6	48	14	18	28	33	40	41	32	26	22	15	14	97.6%	85.4%
STANFORD PARKING LOT	3	101	104	97	97	97	97	97	97	97	97	97	99	97	3,300.0%	95.2%
HOURLY TOTAL	**84**	**206**	**290**	**127**	**136**	**158**	**173**	**186**	**193**	**201**	**183**	**173**	**154**	**149**	239.3%	69.3%

Source: Data collected Thursday, August 7, 1997.

Table 2: Fallen Leaf Lake Weekend Parked Vehicle Counts

Weekend

Location	Number of Parking Spaces			Vehicle Count by Hour											Max. Observed Usage	
	Formal	Informal	Total	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	Formal Spaces	Total Spaces
BIG LOT BY ENTRANCE	0	15	15	0	0	2	2	0	0	1	0	1	0	0	–	13.3%
AFTER CAMPGROUND ON LFT.	0	4	4	1	2	1	1	2	2	2	1	1	0	0	–	50.0%
P.O. ON RT. AFTER B	0	3	3	0	0	0	0	0	1	1	1	1	0	0	–	33.3%
TRAILHEAD RT. SD.	0	9	9	1	1	1	2	3	5	5	6	8	9	3	–	100.0%
TRAILHEAD LFT. SD.	0	8	8	1	1	1	1	4	4	3	8	6	3	2	–	100.0%
P.O. AFTER TRAILHEAD ON LFT.	0	4	4	1	1	0	0	1	1	1	3	2	1	1	–	75.0%
PARKING LOT AT MARINA	28	0	28	7	12	16	24	25	25	26	17	12	7	5	92.9%	92.9%
MARINA	11	9	20	4	8	11	7	8	12	14	16	13	11	7	145.5%	80.0%
CHURCH PARKING, ENTIRE AREA	0	12	12	8	9	12	5	7	6	5	5	5	3	2	–	100.0%
AFTER CHURCH LFT. SD.	0	3	3	1	1	1	2	2	1	1	1	2	1	1	–	66.7%
P.O. LFT. SD.	0	2	2	0	1	1	1	2	2	2	1	1	1	0	–	100.0%
ACROSS BRN. HS. @ WATERFALL	0	2	2	0	0	0	2	2	2	1	1	1	2	0	–	100.0%
RT. ACROSS FROM FALLS - LFT. SD.	0	10	10	0	2	3	3	10	7	5	4	3	2	1	–	100.0%
P.O. AFTER WATERFALL - RT. SD.	0	3	3	1	1	1	2	3	2	2	1	2	0	0	–	100.0%
RT. AFTER P - LFT. SD.	0	2	2	0	0	0	0	3	2	1	1	1	1	1	–	150.0%
RT. AFTER Q - LFT. SD.- MOST PARKED	0	3	3	0	0	1	1	1	1	0	1	2	1	2	–	66.7%
LARGE P.O. - LFT. SD. UP FROM R	0	0	0	0	1	1	1	0	1	0	0	0	1	1	–	–
LFT. SD. CLOSE TO BRIDGE	0	2	2	2	2	2	2	2	2	2	2	2	2	2	–	100.0%
LFT. SD. NEXT TO BRIDGE	0	8	8	4	4	4	5	7	7	8	6	6	3	1	–	100.0%
PARKING LOT @ LILY LAKE	42	6	48	31	35	37	38	43	45	48	41	40	34	25	114.3%	100.0%
STANFORD PARKING LOT	3	101	104	101	101	101	101	101	101	101	101	101	101	101	3,366.7%	97.1%
HOURLY TOTAL	**84**	**206**	**290**	**163**	**182**	**196**	**200**	**226**	**229**	**229**	**217**	**210**	**183**	**155**	272.6%	79.0%

Source: Data collected Sunday, August 3, 1997.

Figure 4: Fallen Leaf Lake Parked Vehicle Counts - Weekday

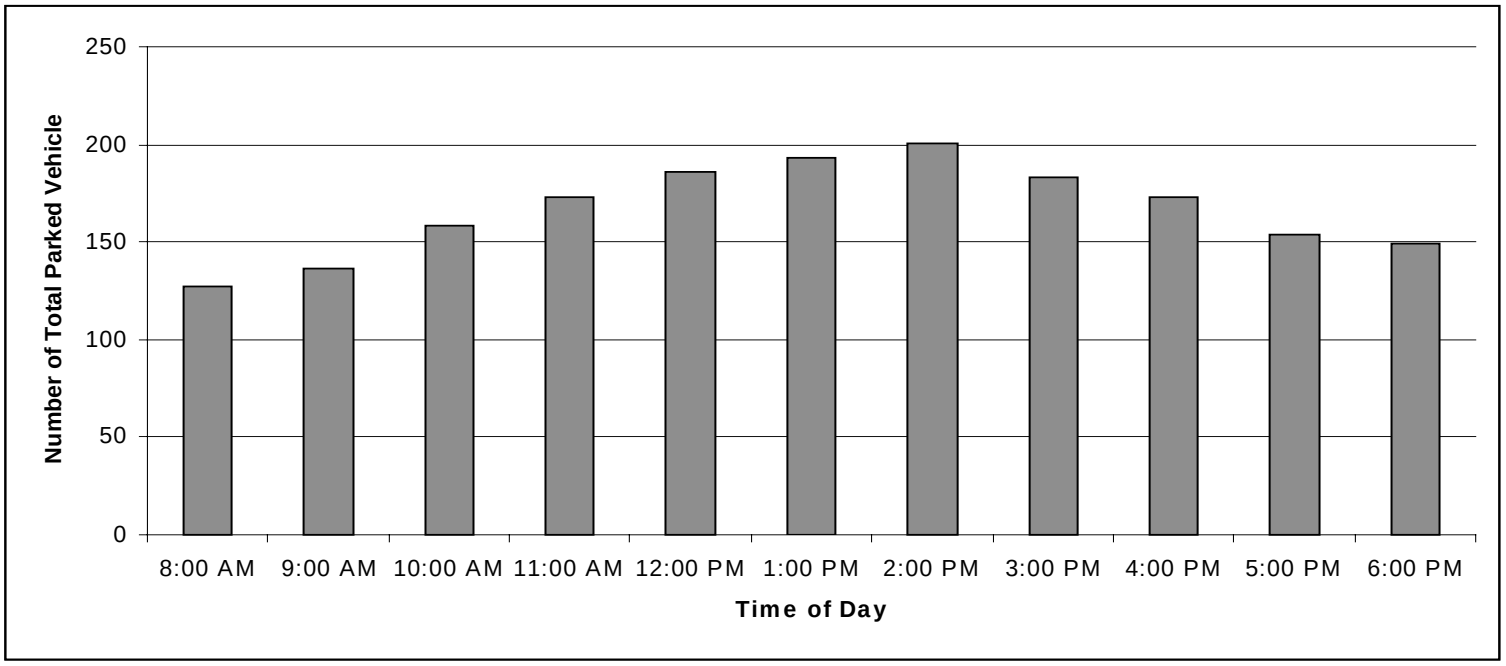
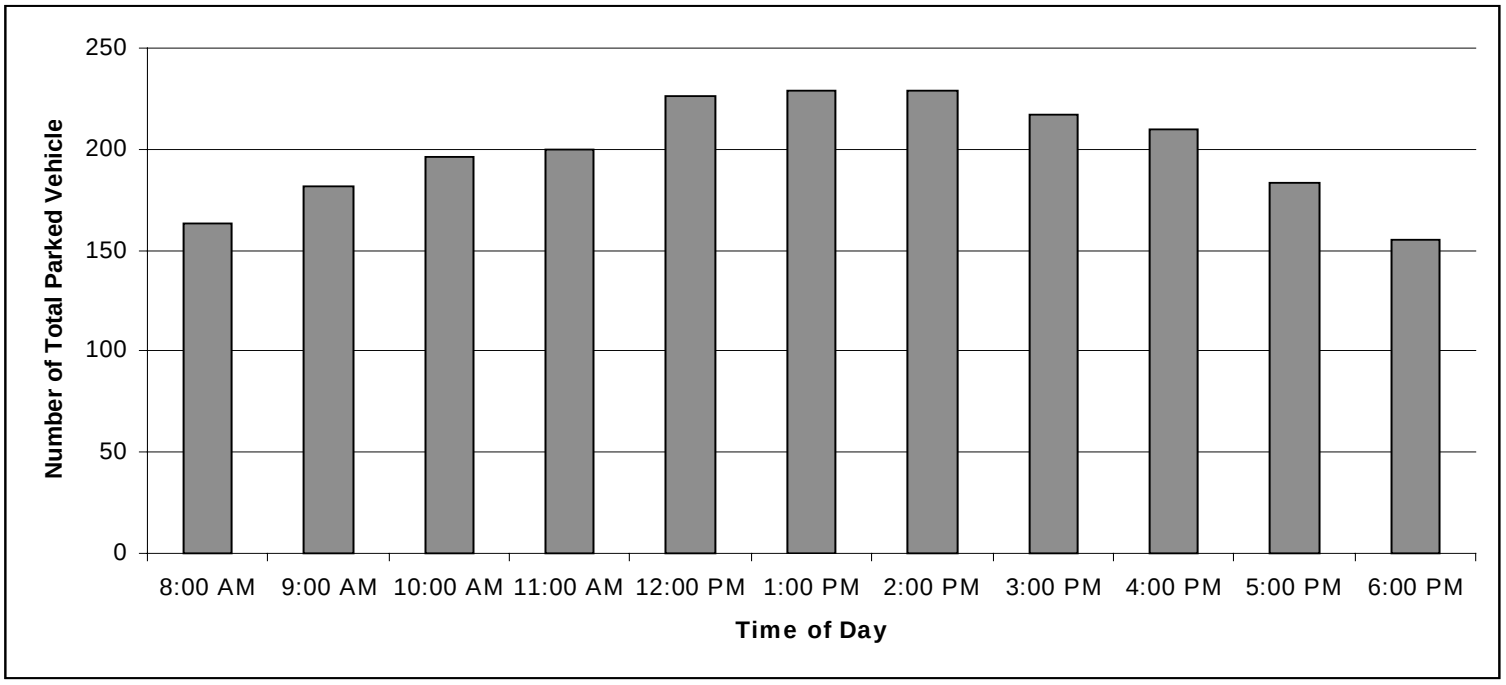


Figure 5: Fallen Leaf Lake Parked Vehicle Counts - Weekend



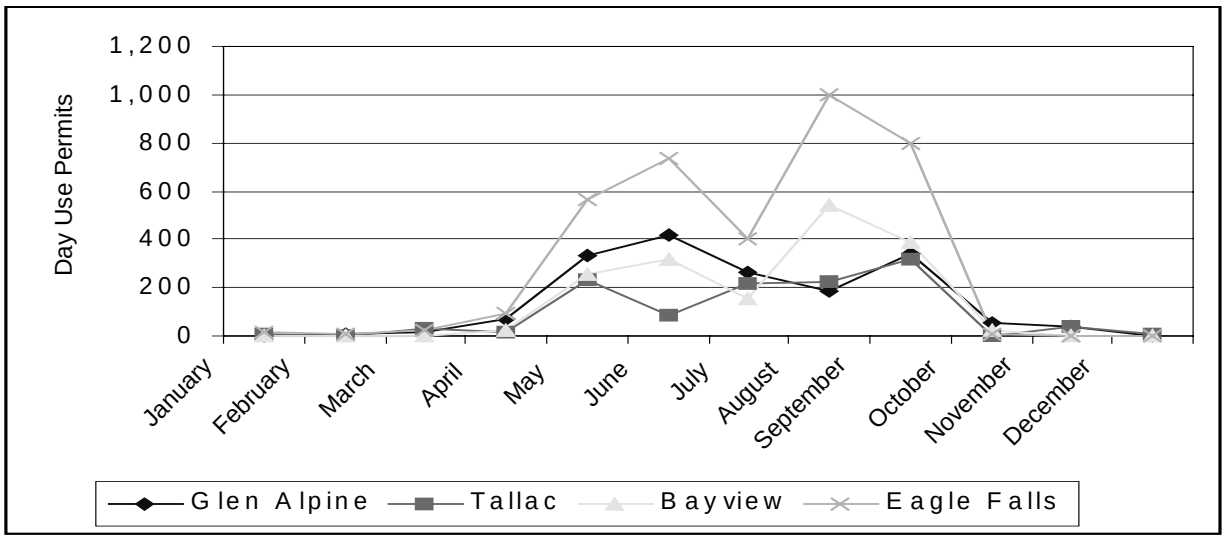
Area Activity Characteristics: Fallen Leaf Lake

Visitation Data at USFS Trailheads - Day use permits by trailhead (Glen Alpine, Tallac, Bayview and Eagle Falls) were gathered for 1992 (see Table 3**:** Day Use Permits by Trailhead, page 14). Day use permits peak from May until September for all four trailheads (see Figure 6). The Glen Alpine trailhead had the highest number of registered users in the Fallen Leaf Lake area, with 1,730 day use permits for the year. Permits filled out at Eagle Falls were more than double the annual total at Glen Alpine. Seasonal usage patterns differed substantially between the various trailheads: while usage peaked in August for the Bayview and Eagle Falls trailheads, total trailhead use for the Glen Alpine trailhead peaked in June. This data also indicates the high usage levels extending into September. The average number of persons per group ranges from 2.16 at the Tallac Trailhead to 2.88 at the Bayview Trailhead. The accuracy of this data especially for July probably contains inaccuracies, which under estimates the number of trail users. Inaccuracies could be the result of trail users not filling out permits.

Table 3: **Day Use Permits by Trailhead**

1992 Data	Trailhead			
	Glen Alpine	Tallac	Bayview	Eagle Falls
January	2	7	3	12
February	4	1	2	11
March	14	29	2	25
April	70	17	26	93
May	330	236	252	569
June	418	82	321	739
July	266	214	155	404
August	188	221	542	1,001
September	344	314	385	794
October	54	0	27	9
November	39	37	3	1
December	1	10	1	0
Annual Total	**1,730**	**1,168**	**1,719**	**3,658**

Figure 6: Day Use Permits by Trailhead



Entrance and exit information from June and July 1992 information indicates that most trail users exit Desolation Wilderness at the same trailhead they enter. While 2 to 4 percent exit at differing trailheads given the lack of transit services, the number of different entry/exit points seen could increase if transit services make one-way hikes feasible. It would still be imperative that services be designed to serve persons entering and exiting at the same locations as the primary assumption regarding transit use.

Table 4: Trailhead Users by Group Size -- June/July, 1992

# In Group	Trailhead: Glen Alpine #	Glen Alpine %	Tallac #	Tallac %	Bayview #	Bayview %	Eagle Falls #	Eagle Falls %
1	16	18%	21	24%	12	14%	11	12%
2	44	51%	45	52%	38	45%	49	52%
3	13	15%	12	14%	10	12%	11	12%
4	6	7%	6	7%	9	11%	9	10%
5	4	5%	1	1%	7	8%	8	9%
6	3	3%	2	2%	3	4%	2	2%
7	1	1%	0	0%	5	6%	4	4%
Average	2.44		2.16		2.88		2.74	

Boat Launching Activity -- A total of 170 boat launches were counted between July 10 and September 1, 1997, equaling an average of only three boat launches per day.

Table 5: Desolation Wilderness Exit Points for Users Entering At Fallen Leaf Lake/Emerald Bay Trailheads

	Trailhead							
Exiting	Glen Alpine		Tallac		Bayview		Eagle Falls	
Trailhead	#	%	#	%	#	%	#	%
Glen Alpine	106	98%	1	1%	0	0%	0	0%
Tallac	0	0%	86	99%	0	0%	0	0%
Bayview	0	0%	0	0%	98	99%	4	4%
Eagle Falls	0	0%	0	0%	1	1%	107	94%
Meeks Bay	0	0%	0	0%	0	0%	2	2%
Cathedral Trail	1	1%	0	0%	0	0%	0	0%
Echo Summit	1	1%	0	0%	0	0%	0	0%
Echo Lakes	0	0%	0	0%	0	0%	1	1%

Source: Based on Permit Data for June & July, 1992

Stanford Camp Activity -- Stanford Camp is situated on twenty acres of property located at the south end of Fallen Leaf Lake. Stanford Camp has an informal parking lot situated at the furthest end of the camp, which accommodates approximately 100 cars. The majority of cars remain parked for the duration of the visitor's stay, usually one week.

Stanford Camp is open from mid-April until the first week of November, however some staff members work during the off season (Stanford Camp employs approximately 70 staff members). The peak visitor season begins the second week of June and lasts through Labor Day weekend. The peak visitor day each week is Saturday, during which an average of 265 guests arrives (while the previous week's visitors are leaving). On a typical Saturday, this could generate as many as 200 cars entering and exiting the area using Fallen Leaf Road.

Visitors to Stanford Camp also include those attending overnight conferences on the premises. For the spring, summer, and fall months of 1997 the conference schedule included the following: seven meetings in April, eleven meetings in May, three in June, ten meetings in both September and October, and two conferences scheduled in November. The number of visitors attending meetings varies from 12 to 170 people with an average of 80 - 100 people per conference. Most meetings occur for an average of two to three days and increase vehicle trips made on Fallen Leaf Road accordingly.

Existing Travel Data: Fallen Leaf Lake

Existing Roadway Vehicle Movement: A road tube (pneumatic tube counter) was installed at Fallen Leaf Lake Road, Tahoe Mountain Road, Fallen Leaf Lake Campground, Vista Point and Vikingsholm to count two-way traffic. Traffic counts varied from a low of 612 for Tahoe Mountain Road to a high of 4,892 at Vista Point. At Fallen Leaf Road 984 vehicles were counted in a nine hour period of time. Tahoe Mountain Road data varied from 612 vehicles in nine hours to 1,402 in a twenty-four hour period of time.

Table 6: Total 2-Way Traffic Counts

Location	August 23, 1997 8:00 am - 5:00 pm	August 30-31, 1997 9:00 am - 9:00 am	Aug. 31 - Sept. 1, 1997 9:00 am - 9:00 am	August 6-7, 1997 9:00 am - 9:00 am	August 7-8, 1997 9:00 am - 9:00 am
Fallen Leaf Lake Road	984				
Tahoe Mountain Road	612	1,402	1,368		
Fallen Leaf Lake at Campground		1,259	1,474		
Vista Point				4,892	4,507
Vikingsholm				4,378	3,985

Source: Data collected using pneumatic tube counters, 1997.

Accident Data -- Accident data was collected from the El Dorado County Sheriff's Department for 1990 through 1997. A total of 14 incidents were reported over this period on Fallen Leaf Road, while 119 were reported on Highway 89. As indicated in Table 10, Fallen Leaf Lake Road incidents consisted of 29 percent (4 incidents) wrong side, 21 percent unsafe speed (3 incidents), 21 percent alcohol/drug related (3 incidents), and 7 percent (1 incident) each improper driving, improper turn, not driver, and other hazard. Annually, Fallen Leaf Road only averaged about two accidents per year.

Table 7: Accident Data, 1990-97

Primary Collision Factor (PCF)	Fallen Leaf Lake Road		Highway 89	
	Number of Incidents	Percent of Incidents	Number of Incidents	Percent of Incidents
Alcohol/Drug	3	21%	14	12%
Hazardous Parking	0	0%	1	1%
Improper Driving	1	7%	4	3%
Improper Pass	0	0%	2	2%
Improper Turn	1	7%	3	3%
Not Driver	1	7%	9	8%
Other Hazard	1	7%	19	16%
Pedestrian Violation	0	0%	1	1%
R-O-W Auto	0	0%	6	5%
Too Close	0	0%	1	1%
Unknown	0	0%	3	3%
Unsafe Speed	3	21%	41	34%
Wrong Side	4	29%	15	13%
Total Number of Incidents	**14**	**100%**	**119**	**100%**

Vehicle Travel Time -- A key issue regarding the provision of transit services will be the actual travel time during congested conditions. On both a weekday and a weekend day during the peak summer period, a TRPA staff member drove between the Fallen Leaf Lake/SR 89 intersection and the Glen Alpine Trailhead to mark the travel times to the nearest minute (see Table 8: Travel Times for Fallen Leaf Lake Road - Weekday, page 19, and Table 9: Travel Times for Fallen Leaf Lake Road - Weekend, page 20). Travel times on Fallen Leaf Road averaged 21 - 22 minutes on a weekday and 23 - 25 minutes on the weekend. The number of pullovers observed ranged from 5 - 6 on a weekday and 8 - 9 on the weekend. Travel speed ranged from 12.6 - 12.8 miles per hour on the weekday to 11.1 - 11.8 miles per hour on the weekend. In general, little variation was observed in travel time.

Parked Vehicle Counts -- Hourly counts of the number of parked vehicles in various subareas were taken on a Saturday and peak season weekday (see Table 1: Fallen Leaf Lake Weekday Parked Vehicle Counts, page 11, and Table 2: Fallen Leaf Lake Weekend Parked Vehicle Counts, page 12). Parked vehicle counts were conducted during the week and on the weekend. The Fallen Leaf Lake area averages 69.3 percent of total capacity (239.3 percent of formal spaces) during the week and 79 percent (272.6 percent of formal spaces) during the weekend. During the week, parking capacity was fully utilized at the marina, as well as several pullouts. On the weekend, parking was fully utilized in a majority of the areas. On both weekdays and weekends, total parking accumulation peaked in the 2:00 P.M. hour.

Stanford Camp Van Passenger Activity – Stanford Camp provides transportation for guests throughout the week with a total of four passenger vans (with a seating capacity of seven passengers per van). The vehicles are not wheelchair accessible, but can accommodate space for a wheelchair by folding seats. Typically, vans make one run into town each day to accommodate visitor and staff needs. The van leaves at approximately 9:30 A.M. in the morning, going outbound on Fallen Leaf Lake Road and returns inbound on the same road at around 2:00 P.M. More town runs are made during a busy day if the need for extra vehicle trips exists. On Saturdays the passenger vans accommodate those guests arriving at the Tahoe airport and during the week, usually once a day, children are transported to group activities which include hiking and swimming.

Traveler Characteristics: Fallen Leaf Lake

Inbound Fallen Leaf Lake Road Intercept Survey -- Using enforcement provided by the El Dorado County Sheriff's Department, the southbound drivers (cars, bicyclists, pedestrians, etc.) on Fallen Leaf Road immediately south of Tahoe Mountain Road were voluntarily asked to stop and permit themselves to be surveyed on Saturday, August 16th, 1997, between 6:00 A.M. and 6:00 P.M. (see Table 10: Fallen Leaf Lake Road Intercept Survey - Inbound, page 22). A total of 489 surveys were collected orally.

Of the completed surveys with valid responses, 73.4 percent used Fallen Leaf Road as the access road from the north while 26.6 percent used Tahoe Mountain Road from the south. The majority (54.6 percent) of the vehicles was automobile traffic including pickups, with vans (23.4 percent), and trucks (19.9 percent) following. There were very few autos with trailers, RVs or tow trucks. Vehicle occupancy of two persons was most common (41.7 percent), followed by one person (16.5 percent), three and four persons (both 15.7 percent). Very few vehicles had five or more passengers (10.3 percent).

Table 8: Travel Times for Fallen Leaf Lake Road - Weekday

		Pass											
		1	2	3	4	5	6	7	8	9	10	11	**Average**
ROADWAY TIMES													
ENTERING													
Hwy 89 and Fallen Leaf Road		10:00 AM	10:45 AM	11:31 AM	12:17 PM	1:02 PM	1:48 PM	2:35 PM	3:20 PM	4:05 PM	4:50 PM	5:35 PM	–
Entrance to the USFS Campground		10:02 AM	10:47 AM	11:33 AM	12:19 PM	1:04 PM	1:50 PM	2:37 PM	3:22 PM	4:07 PM	4:52 PM	5:37 PM	–
Fredricks Cabin Road & FLL Road		10:05 AM	10:49 AM	11:36 AM	12:22 PM	1:07 PM	1:52 PM	2:40 PM	3:24 PM	4:09 PM	4:54 PM	5:39 PM	–
Tahoe Mountain Road and FLL Road		10:08 AM	10:52 AM	11:39 AM	12:24 PM	1:10 PM	1:55 PM	2:42 PM	3:27 PM	4:12 PM	4:57 PM	5:42 PM	–
Emigrant Road and FLL Road		10:12 AM	10:56 AM	11:42 AM	12:28 PM	1:14 PM	1:59 PM	2:46 PM	3:30 PM	4:15 PM	5:00 PM	5:46 PM	–
Store at South End		10:17 AM	11:02 AM	11:48 AM	12:34 PM	1:20 PM	2:06 PM	2:52 PM	3:37 PM	4:23 PM	5:06 PM	5:51 PM	–
Glen Alpine Trailhead		10:22 AM	11:07 AM	11:53 AM	12:39 PM	1:25 PM	2:11 PM	2:57 PM	3:42 PM	4:28 PM	5:11 PM	5:56 PM	–
LEAVING													
Glen Alpine Trailhead		10:22 AM	11:08 AM	11:54 AM	12:40 PM	1:26 PM	2:12 PM	2:58 PM	3:42 PM	4:29 PM	5:11 PM	–	–
Store at South End		10:27 AM	11:13 AM	11:59 AM	12:45 PM	1:31 PM	2:17 PM	3:03 PM	3:47 PM	4:34 PM	5:16 PM	–	–
Emigrant Road and FLL Road		10:34 AM	11:19 AM	12:05 PM	12:50 PM	1:37 PM	2:23 PM	3:09 PM	3:54 PM	4:39 PM	5:24 PM	–	–
Tahoe Mountain Road and FLL Road		10:38 AM	11:23 AM	12:09 PM	12:54 PM	1:41 PM	2:27 PM	3:12 PM	3:58 PM	4:42 PM	5:28 PM	–	–
Fredricks Cabin Road & FLL Road		10:40 AM	11:26 AM	12:12 PM	12:57 PM	1:43 PM	2:30 PM	3:15 PM	4:00 PM	4:45 PM	5:31 PM	–	–
Entrance to the USFS Campground		10:43 AM	11:28 AM	12:14 PM	12:59 PM	1:45 PM	2:32 PM	3:17 PM	4:02 PM	4:47 PM	5:33 PM	–	–
Hwy 89 and Fallen Leaf Road		10:45 AM	11:30 AM	12:16 PM	1:01 PM	1:47 PM	2:34 PM	3:19 PM	4:04 PM	4:49 PM	5:35 PM	–	–
TRAVEL TIMES (MINUTES)													
ENTERING													
Hwy 89 and Fallen Leaf Road		–	–	–	–	–	–	–	–	–	–	–	–
Entrance to the USFS Campground		0:02	0:02	0:02	0:02	0:02	0:02	0:02	0:02	0:02	0:02	0:02	**0:02**
Fredricks Cabin Road & FLL Road		0:03	0:02	0:03	0:03	0:03	0:02	0:03	0:02	0:02	0:02	0:02	**0:02**
Tahoe Mountain Road and FLL Road		0:03	0:03	0:03	0:02	0:03	0:03	0:02	0:03	0:03	0:03	0:03	**0:02**
Emigrant Road and FLL Road		0:04	0:04	0:03	0:04	0:04	0:04	0:04	0:03	0:03	0:03	0:04	**0:03**
Store at South End		0:05	0:06	0:06	0:06	0:06	0:07	0:06	0:07	0:08	0:06	0:05	**0:06**
Glen Alpine Trailhead		0:05	0:05	0:05	0:05	0:05	0:05	0:05	0:05	0:05	0:05	0:05	**0:05**
Total Travel Time		*0:22*	*0:22*	*0:22*	*0:22*	*0:23*	*0:23*	*0:22*	*0:22*	*0:23*	*0:21*	*0:21*	***0:22***
LEAVING													
Glen Alpine Trailhead		–	–	–	–	–	–	–	–	–	–	–	–
Store at South End		0:05	0:05	0:05	0:05	0:05	0:05	0:05	0:05	0:05	0:05	–	**0:05**
Emigrant Road and FLL Road		0:07	0:06	0:06	0:05	0:06	0:06	0:06	0:07	0:05	0:08	–	**0:06**
Tahoe Mountain Road and FLL Road		0:04	0:04	0:04	0:04	0:04	0:04	0:03	0:04	0:03	0:04	–	**0:03**
Fredricks Cabin Road & FLL Road		0:02	0:03	0:03	0:03	0:02	0:03	0:03	0:02	0:03	0:03	–	**0:02**
Entrance to the USFS Campground		0:03	0:02	0:02	0:02	0:02	0:02	0:02	0:02	0:02	0:02	–	**0:02**
Hwy 89 and Fallen Leaf Road		0:02	0:02	0:02	0:02	0:02	0:02	0:02	0:02	0:02	0:02	–	**0:02**
Total Travel Time		*0:23*	*0:22*	*0:22*	*0:21*	*0:21*	*0:22*	*0:21*	*0:22*	*0:20*	*0:24*	–	***0:21***
NUMBERS OF PULLOVERS													
ENTERING													
Hwy 89 and Fallen Leaf Road		0	0	0	0	0	0	0	0	0	0	0	**0**
Entrance to the USFS Campground		0	0	0	0	0	0	0	0	0	0	0	**0**
Fredricks Cabin Road & FLL Road		0	0	0	0	0	0	0	0	0	0	0	**0**
Tahoe Mountain Road and FLL Road		0	1	0	0	1	0	0	0	0	1	0	**0**
Emigrant Road and FLL Road		0	0	0	1	0	0	1	0	1	0	1	**0**
Store at South End		2	2	4	7	2	5	4	4	5	3	3	**4**
Glen Alpine Trailhead		0	1	0	0	1	1	2	2	1	1	0	**1**
Total Number of Pullovers		*2*	*4*	*4*	*8*	*4*	*6*	*7*	*6*	*7*	*5*	*4*	***5***
LEAVING													
Glen Alpine Trailhead		0	0	0	0	0	0	0	0	0	0	–	**0**
Store at South End		3	3	0	1	2	1	0	0	1	1	–	**1**
Emigrant Road and FLL Road		3	5	3	3	5	6	3	3	3	4	–	**4**
Tahoe Mountain Road and FLL Road		0	0	1	0	1	2	0	0	0	1	–	**1**
Fredricks Cabin Road & FLL Road		0	0	0	0	0	1	0	0	0	0	–	**0**
Entrance to the USFS Campground		0	0	0	0	0	0	0	0	0	0	–	**0**
Hwy 89 and Fallen Leaf Road		0	0	0	0	0	0	0	0	0	0	–	**0**
Total Number of Pullovers		*6*	*8*	*4*	*4*	*8*	*10*	*3*	*3*	*4*	*6*	–	***6***
SPEED (MILES/HOUR)	DISTANCE												
ENTERING	(Miles)												
Hwy 89 and Fallen Leaf Road	–	–	–	–	–	–	–	–	–	–	–	–	–
Entrance to the USFS Campground	0.50	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	**15.0**
Fredricks Cabin Road & FLL Road	0.75	15.0	22.5	15.0	15.0	15.0	22.5	15.0	22.5	22.5	22.5	22.5	**19.1**
Tahoe Mountain Road and FLL Road	0.65	13.0	13.0	13.0	19.5	13.0	13.0	19.5	13.0	13.0	13.0	13.0	**14.2**
Emigrant Road and FLL Road	0.95	14.3	14.3	19.0	14.3	14.3	14.3	14.3	19.0	19.0	19.0	14.3	**16.0**
Store at South End	1.50	18.0	15.0	15.0	15.0	15.0	12.9	15.0	12.9	11.3	15.0	18.0	**14.8**
Glen Alpine Trailhead	0.30	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	**3.6**
Average Speed	4.65	12.7	12.7	12.7	12.7	12.1	12.1	12.7	12.7	12.1	13.3	13.3	***12.6***
LEAVING													
Glen Alpine Trailhead	–	–	–	–	–	–	–	–	–	–	–	–	–
Store at South End	0.30	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	–	**3.6**
Emigrant Road and FLL Road	1.50	12.9	15.0	15.0	18.0	15.0	15.0	15.0	12.9	18.0	11.3	–	**14.8**
Tahoe Mountain Road and FLL Road	0.95	14.3	14.3	14.3	14.3	14.3	14.3	19.0	14.3	19.0	14.3	–	**15.2**
Fredricks Cabin Road & FLL Road	0.65	19.5	13.0	13.0	13.0	19.5	13.0	13.0	19.5	13.0	13.0	–	**15.0**
Entrance to the USFS Campground	0.75	15.0	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	–	**21.7**
Hwy 89 and Fallen Leaf Road	0.50	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	–	**15.0**
Average Speed	4.65	*12.1*	*12.7*	*12.7*	*13.3*	*13.3*	*12.7*	*13.3*	*12.7*	*14.0*	*11.6*	–	*12.8*

Source: Data collected on Thursday, July 31, 1997.

Table 9: Travel Times for Fallen Leaf Lake Road - Weekend

		Pass										
		1	2	3	4	5	6	7	8	9	10	**Average**
ROADWAY TIMES												
ENTERING												
Hwy 89 and Fallen Leaf Road		10:00 AM	10:49 AM	11:38 AM	12:26 PM	1:17 PM	2:10 PM	3:01 PM	4:01 PM	4:48 PM	5:35 PM	–
Entrance to the USFS Campground		10:02 AM	10:51 AM	11:41 AM	12:29 PM	1:20 PM	2:12 PM	3:03 PM	4:03 PM	4:50 PM	5:37 PM	–
Fredricks Cabin Road & FLL Road		10:04 AM	10:54 AM	11:44 AM	12:31 PM	1:23 PM	2:15 PM	3:06 PM	4:05 PM	4:52 PM	5:39 PM	–
Tahoe Mountain Road and FLL Road		10:07 AM	10:56 AM	11:47 AM	12:34 PM	1:26 PM	2:18 PM	3:09 PM	4:08 PM	4:55 PM	5:42 PM	–
Emigrant Road and FLL Road		10:10 AM	11:00 AM	11:50 AM	12:38 PM	1:29 PM	2:22 PM	3:13 PM	4:11 PM	4:59 PM	5:46 PM	–
Store at South End		10:17 AM	11:07 AM	11:57 AM	12:45 PM	1:37 PM	2:29 PM	3:22 PM	4:18 PM	5:06 PM	5:53 PM	–
Glen Alpine Trailhead		10:24 AM	11:13 AM	12:03 PM	12:51 PM	1:45 PM	2:36 PM	3:29 PM	4:25 PM	5:12 PM	5:59 PM	–
LEAVING												
Glen Alpine Trailhead												
Store at South End		10:24 AM	11:13 AM	12:04 PM	12:52 PM	1:46 PM	2:37 PM	3:31 PM	4:25 PM	5:12 PM	–	–
Emigrant Road and FLL Road		10:30 AM	11:19 AM	12:08 PM	12:57 PM	1:51 PM	2:43 PM	3:38 PM	4:31 PM	5:17 PM	–	–
Tahoe Mountain Road and FLL Road		10:37 AM	11:27 AM	12:16 PM	1:05 PM	1:58 PM	2:50 PM	3:49 PM	4:38 PM	5:24 PM	–	–
Fredricks Cabin Road & FLL Road		10:41 AM	11:30 AM	12:19 PM	1:09 PM	2:01 PM	2:53 PM	3:53 PM	4:42 PM	5:28 PM	–	–
Entrance to the USFS Campground		10:44 AM	11:33 AM	12:21 PM	1:11 PM	2:04 PM	2:56 PM	3:55 PM	4:44 PM	5:30 PM	–	–
Hwy 89 and Fallen Leaf Road		10:46 AM	11:35 AM	12:24 PM	1:14 PM	2:07 PM	2:58 PM	3:58 PM	4:46 PM	5:32 PM	–	–
		10:48 AM	11:37 AM	12:26 PM	1:16 PM	2:09 PM	3:00 PM	4:00 PM	4:48 PM	5:34 PM	–	–
TRAVEL TIMES (MINUTES)												
ENTERING												
Hwy 89 and Fallen Leaf Road												
Entrance to the USFS Campground		–	–	–	–	–	–	–	–	–	–	–
Fredricks Cabin Road & FLL Road		0:02	0:02	0:03	0:03	0:03	0:02	0:02	0:02	0:02	0:02	**0:02**
Tahoe Mountain Road and FLL Road		0:02	0:03	0:03	0:02	0:03	0:03	0:03	0:02	0:02	0:02	**0:02**
Emigrant Road and FLL Road		0:03	0:02	0:03	0:03	0:03	0:03	0:03	0:03	0:03	0:03	**0:02**
Store at South End		0:03	0:04	0:03	0:04	0:03	0:04	0:04	0:03	0:04	0:04	**0:03**
Glen Alpine Trailhead		0:07	0:07	0:07	0:07	0:08	0:07	0:09	0:07	0:07	0:07	**0:07**
Total Travel Time		0:07	0:06	0:06	0:06	0:08	0:07	0:07	0:07	0:06	0:06	**0:06**
		0:24	*0:24*	*0:25*	*0:25*	*0:28*	*0:26*	*0:28*	*0:24*	*0:24*	*0:24*	***0:25***
LEAVING												
Glen Alpine Trailhead												
Store at South End		–	–	–	–	–	–	–	–	–	–	–
Emigrant Road and FLL Road		0:06	0:06	0:04	0:05	0:05	0:06	0:07	0:06	0:05	–	**0:05**
Tahoe Mountain Road and FLL Road		0:07	0:08	0:08	0:08	0:07	0:07	0:11	0:07	0:07	–	**0:07**
Fredricks Cabin Road & FLL Road		0:04	0:03	0:03	0:04	0:03	0:03	0:04	0:04	0:04	–	**0:03**
Entrance to the USFS Campground		0:03	0:03	0:02	0:02	0:03	0:03	0:02	0:02	0:02	–	**0:02**
Hwy 89 and Fallen Leaf Road		0:02	0:02	0:03	0:03	0:03	0:02	0:03	0:02	0:02	–	**0:02**
Total Travel Time		0:02	0:02	0:02	0:02	0:02	0:02	0:02	0:02	0:02	–	**0:02**
		0:24	*0:24*	*0:22*	*0:24*	*0:23*	*0:23*	*0:29*	*0:23*	*0:22*	–	**0:23**
NUMBERS OF PULLOVERS												
ENTERING												
Hwy 89 and Fallen Leaf Road												
Entrance to the USFS Campground		0	0	0	0	0	0	0	0	0	0	**0**
Fredricks Cabin Road & FLL Road		0	0	0	0	0	1	0	0	0	0	**0**
Tahoe Mountain Road and FLL Road		0	0	0	0	0	1	0	0	0	0	**0**
Emigrant Road and FLL Road		0	1	0	0	0	0	1	1	1	0	**0**
Store at South End		0	1	0	1	0	4	2	0	0	1	**1**
Glen Alpine Trailhead		7	8	6	7	5	3	7	8	6	7	**6**
Total Number of Pullovers		0	0	0	3	2	1	1	2	2	1	**1**
		7	*10*	*6*	*11*	*7*	*10*	*11*	*11*	*9*	*9*	***9***
LEAVING												
Glen Alpine Trailhead												
Store at South End		0	0	0	0	0	0	0	0	0	–	**0**
Emigrant Road and FLL Road		0	1	2	2	2	3	0	2	0	–	**1**
Tahoe Mountain Road and FLL Road		2	6	5	9	5	9	9	8	5	–	**6**
Fredricks Cabin Road & FLL Road		0	0	0	0	0	0	3	1	1	–	**1**
Entrance to the USFS Campground		1	1	0	1	0	0	1	0	0	–	**0**
Hwy 89 and Fallen Leaf Road		0	0	1	0	0	0	1	0	0	–	**0**
Total Number of Pullovers		0	1	0	0	0	0	0	0	0	–	**0**
		3	*9*	*8*	*12*	*7*	*12*	*14*	*11*	*6*	–	***9***
SPEED (MILES/HOUR)	DISTANCE											
ENTERING	(Miles)											
Hwy 89 and Fallen Leaf Road	–	–	–	–	–	–	–	–	–	–	–	–
Entrance to the USFS Campground	0.50	15.0	15.0	10.0	10.0	10.0	15.0	15.0	15.0	15.0	15.0	**13.5**
Fredricks Cabin Road & FLL Road	0.75	22.5	15.0	15.0	22.5	15.0	15.0	15.0	22.5	22.5	22.5	**18.8**
Tahoe Mountain Road and FLL Road	0.65	13.0	19.5	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	**13.6**
Emigrant Road and FLL Road	0.95	19.0	14.3	19.0	14.3	19.0	14.3	14.3	19.0	14.3	14.3	**16.2**
Store at South End	1.50	12.9	12.9	12.9	12.9	11.3	12.9	10.0	12.9	12.9	12.9	**12.4**
Glen Alpine Trailhead	0.30	2.6	3.0	3.0	3.0	2.3	2.6	2.6	2.6	3.0	3.0	**2.8**
Average Speed	4.65	*11.6*	*11.6*	*11.2*	*11.2*	*10.0*	*10.7*	*10.0*	*11.6*	*11.6*	*11.6*	***11.1***
LEAVING												
Glen Alpine Trailhead	–	–	–	–	–	–	–	–	–	–	–	–
Store at South End	0.30	3.0	3.0	4.5	3.6	3.6	3.0	2.6	3.0	3.6	–	**3.3**
Emigrant Road and FLL Road	1.50	12.9	11.3	11.3	11.3	12.9	12.9	8.2	12.9	12.9	–	**11.8**
Tahoe Mountain Road and FLL Road	0.95	14.3	19.0	19.0	14.3	19.0	19.0	14.3	14.3	14.3	–	**16.4**
Fredricks Cabin Road & FLL Road	0.65	13.0	13.0	19.5	19.5	13.0	13.0	19.5	19.5	19.5	–	**16.6**
Entrance to the USFS Campground	0.75	22.5	22.5	15.0	15.0	15.0	22.5	15.0	22.5	22.5	–	**19.2**
Hwy 89 and Fallen Leaf Road	0.50	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	–	**15.0**
Average Speed	4.65	*11.6*	*11.6*	*12.7*	*11.6*	*12.1*	*12.1*	*9.6*	*12.1*	*12.7*	–	***11.8***

Source: Data collected on Saturday, July 18, 1997.

Of the 488 valid responses, 67.8 percent said that this was not their first visit to the Fallen Leaf Lake area while 32.2 percent were visiting for the first time. When asked how long they planned to stay, the recorded answers were 43.4 percent were staying for several hours and 56.6 percent were planning to stay overnight. Of those respondents staying overnight, 30.1 percent were residents or property owners in the area, 25.2 percent were Stanford Camp guests, 18.9 percent were house guests, 14.1 percent stated “other” as their visitor type, 9.7 percent were backpackers or equestrians and only 1.9 percent were an employee housed in the area. Again asking just those respondents staying overnight in the area, the trip purpose most commonly stated was “accessing from outside the Tahoe Basin” (46.8 percent) followed by recreation and personal errands (both 20.9 percent), shopping (9.5 percent) and work (1.3 percent). Of the 62 residents/property owners, 58 responded to the question regarding how many weeks per year they live in the area: responses ranged from 1-5 weeks (43.1 percent), 6-10 weeks (22.4 percent), 11-20 weeks or summer only (17.2 percent), 21-30 weeks (6.9 percent), 51-52 weeks or full time (6.9 percent), and only 1.7 percent (1 respondent) reported staying either 31-40 weeks or 41-50 weeks.

Respondents who reported that they were not staying overnight were asked where they were from; the largest percentage were from California, particularly the Bay Area (34.3 percent), South Lake Tahoe (19.5 percent), Sacramento area (14.8 percent), with another 17.9 percent from other areas in California. Surprisingly, only 4.4 percent were from Nevada with the remainder from Oregon, Washington, other states, or international visitors. The trip purpose of those respondents just visiting for the day ranged from sightseeing to view Fallen Leaf Lake (36.5 percent), day hiking/running/horse trip (22.6 percent), multiple purposes (9.4 percent), visiting relatives/friends (6.8 percent), launching a boat (5.5 percent) with the remaining 19.3 percent either biking, fishing, locating a campsite, picnicking, working, or a myriad of other activities.

Those persons who were sightseeing or using a trail were asked if they would still travel to the south end of the lake if there was parking and a view of the lake at the north end; 40.3 percent of the valid responses said they would still travel to the south end, 32.6 percent would not and 27.1 percent stated “maybe” they would still travel to the south end. This group was also asked “if this parking area required a five-minute walk for a view of the lake, would you still be planning to travel to the south end” and similarly 40.3 percent said yes, 33.3 percent said no and 26.4 percent stated “maybe” they would still travel to the south end of the lake. Significantly, requiring a five-minute walk between the theoretical parking lot and the view of the lake does not substantially impact the proportion of drivers that would use the lot.

In order to gain a better understanding of which visitors used each access route, the data was cross-tabulated. In general, overnight visitors use both access roads. Property owners (54.8 percent) and employees housed in the area (100 percent) are more likely to use Tahoe Mountain Road, while backpackers/equestrians (75 percent), Stanford Camp guests (65.4 percent) and houseguests (66.7 percent) are more likely to use Fallen Leaf Lake Road. For respondents staying overnight, 71.6 percent used Fallen Leaf Lake Road from the north. Only those running a personal errand or shopping showed higher usage of Tahoe Mountain Road. Trip purpose for day visitors was compared to the access roads used and again, in total, 71.6 percent of all respondents used Fallen Leaf Lake Road. Only those day visitors traveling to work showed a higher incidence of using Tahoe Mountain Road over Fallen Leaf Lake Road.

Table 10: Fallen Leaf Lake Road Intercept Survey - Inbound

Page 1 of 3

	# of Responses	Percent	
		Total	Valid Responses
Total Number of Surveys	489	100.0%	100.0%
Access Route:			
Fallen Leaf Lake Rd from the north	350	71.6%	73.4%
Tahoe Mountain Rd from the south	127	26.0%	26.6%
NA	12	2.5%	–
Total	*489*	*100.0%*	*100.0%*
Vehicle Type:			
Auto (including pickups)	261	53.4%	54.6%
Van	112	22.9%	23.4%
Truck	95	19.4%	19.9%
Auto with boat trailer	7	1.4%	1.5%
Auto with horse trailer	0	0.0%	0.0%
RV	2	0.4%	0.4%
Tow Truck	1	0.2%	0.2%
NA	11	2.2%	–
Total	*489*	*100.0%*	*100.0%*
Vehicle Occupancy:			
One	78	16.0%	16.5%
Two	197	40.3%	41.7%
Three	74	15.1%	15.7%
Four	74	15.1%	15.7%
Five	30	6.1%	6.4%
Six	11	2.2%	2.3%
Seven	4	0.8%	0.8%
Eight	0	0.0%	0.0%
Nine	1	0.2%	0.2%
Ten	2	0.4%	0.4%
Fifteen	1	0.2%	0.2%
NA	17	3.5%	–
Total	*489*	*100.0%*	*100.0%*
Is this your first visit to the Fallen Leaf Lake area?			
Yes	157	32.1%	32.2%
No	331	67.7%	67.8%
NA	1	0.2%	–
Total	*489*	*100.0%*	*100.0%*
How long will you be staying in the Fallen Leaf Lake area?			
Less Than 1 Day	157	32.1%	43.4%
Staying At Least Overnight	205	41.9%	56.6%
NA	127	26.0%	–
Total	*489*	*100.0%*	*100.0%*

Source: Data collected on Saturday, August 16, 1997, between 6:00 AM and 6:00 PM.

Table 12 (continued): Fallen Leaf Lake Road Intercept Survey - Inbound

Page 2 of 3	# of Responses	Percent	
		Total	Valid Responses
Visitor Type:			
Resident/property owner in the area	62	12.7%	30.1%
Backpacker/equestrian	20	4.1%	9.7%
Stanford Camp guest	52	10.6%	25.2%
Houseguest	39	8.0%	18.9%
Employee housed in the area	4	0.8%	1.9%
Other	29	5.9%	14.1%
NA - Not staying overnight	283	57.9%	–
Total	*489*	*100.0%*	*100.0%*
Trip Purpose:			
Recreation	33	6.7%	20.9%
Personal Errand	33	6.7%	20.9%
Dining	0	0.0%	0.0%
Shopping	15	3.1%	9.5%
Accessing from outside the Tahoe Basin	74	15.1%	46.8%
Work	2	0.4%	1.3%
Other	1	0.2%	0.6%
NA - Not staying overnight	331	67.7%	–
Total	*489*	*100.0%*	*100.0%*
If resident/property owner: How many weeks per year do you live here?			
1-5 Weeks/Year	25	5.1%	43.1%
6-10 Weeks/Year	13	2.7%	22.4%
11-20 Weeks/Year (Summer Only)	10	2.0%	17.2%
21-30 Weeks/Year	4	0.8%	6.9%
31-40 Weeks/Year	1	0.2%	1.7%
41-50 Weeks/Year	1	0.2%	1.7%
51-52 Weeks/Year (Full Time)	4	0.8%	6.9%
NA - Not resident/property owner	431	88.1%	–
Total	*489*	*100.0%*	*100.0%*
The following two questions were asked only of persons not staying overnight:			
Where do you live?			
CA, Bay Area	132	*27.0%*	34.3%
CA, Sacramento Area	57	*11.7%*	14.8%
CA, Los Angeles Area	20	*4.1%*	5.2%
CA, South Lake Tahoe	75	*15.3%*	19.5%
CA, San Diego Area	5	*1.0%*	1.3%
CA, Other	44	*9.0%*	11.4%
NV	17	*3.5%*	4.4%
OR	2	*0.4%*	0.5%
WA	2	*0.4%*	0.5%
Other Western Out-of-State	10	*2.0%*	2.6%
Eastern Out-of-State	11	*2.2%*	2.9%
International	10	*2.0%*	2.6%
NA	104	*21.3%*	–
Total	*489*	*100.0%*	*100.0%*

Table 12 (continued): Fallen Leaf Lake Road Intercept Survey - Inbound

Page 3 of 3	# of Responses	Percent	
		Total	Valid Responses
What is the purpose of your trip?			
Biking	1	0.2%	0.3%
Boat launch	17	3.5%	5.5%
Chapel	3	0.6%	1.0%
Day hiking/running/horse trip	70	14.3%	22.6%
Delivery	4	0.8%	1.3%
Family Reunion	2	0.4%	0.6%
Fishing	15	3.1%	4.8%
Locate a campsite	2	0.4%	0.6%
Multiple (usually sightseeing plus other)	29	5.9%	9.4%
Picnic	3	0.6%	1.0%
Sightseeing to view Fallen Leaf lake	113	23.1%	36.5%
Sightseeing to view Glen Alpine Falls	12	2.5%	3.9%
Travel to work	13	2.7%	4.2%
Visit relatives/friends	21	4.3%	6.8%
Waterski	3	0.6%	1.0%
Wedding	2	0.4%	0.6%
NA	179	36.6%	–
Total	*489*	*100.0%*	*100.0%*
The following questions were asked only of persons sightseeing or using a trail:			
If there was a parking area at the north end of Fallen Leaf Lake that provided a view of the lake, would you still be planning to travel to the south end?			
Yes	52	10.6%	40.3%
No	42	8.6%	32.6%
Maybe	35	7.2%	27.1%
NA - Not sightseer or trail user	360	73.6%	–
Total	*489*	*100.0%*	100.0%
If this parking area required a five-minute walk for a view of the lake, would you still be planning to travel to the south end?			
Yes	52	10.6%	40.3%
No	43	8.8%	33.3%
Maybe	34	7.0%	26.4%
NA - Not sightseer or trail user	360	73.6%	–
Total	*489*	*100.0%*	*100.0%*

Source: Data collected on Saturday, August 16, 1997, between 6:00 AM and 6:00 PM.

Outbound Fallen Leaf Lake Intercept Survey -- With the help of a Sheriff's Deputy, on Saturday, August 16, 1997 (a *different* day than that surveyed on the inbound direction), drivers traveling northbound on Fallen Leaf Lake Road immediately south of Tahoe Mountain Road between 6 A. M. and 6 P. M. volunteered to stop and be surveyed (see Table 11: Fallen Leaf Lake Road Intercept Survey - Outbound, page 26). A total of 457 vehicles were surveyed and of those, 52.4 percent were automobiles or pickups, 25.4 percent trucks and 21.3 percent were reported as vans. As with the Inbound Survey, the most commonly reported vehicle occupancy was two persons (33.7 percent), followed by one (20.8 percent), four (20.1 percent), three persons (15.1 percent) with vehicle occupancy of five or more accounting for less than ten percent.

Each vehicle stopped was asked if they were on either a sightseeing trip or using a trail; 43.4 percent said yes while the remaining 56.6 percent said no and the interview was ended. For those respondents who were on a sightseeing trip or using a trail (almost 198 respondents), 42.5 percent were sightseeing Fallen Leaf Lake, 23.5 percent had multiple purposes, 18.5 percent were hiking or running, 11.5 percent were sightseeing to Glen Alpine Falls and the remainder (4 percent) reported "other" trip purposes, a horse trip or biking.

Questions related to potential use of alternative parking areas at the north end of the lake were asked of those respondents that were sightseeing to Fallen Leaf Lake (only 22.2 percent or 97 respondents). First respondents were asked if they would still travel to the south end of the lake if there was a parking area at the north end that provided a view of the lake; 45.4 percent said yes, 35.1 percent said no and 19.6 percent "maybe." These same respondents were asked if they would still have traveled to the south end of the lake if this parking area at the north end required a five-minute walk for a view of the lake; 48.5 percent said yes, 33 percent no and 18.6 percent said "maybe."

All sightseers and trail users (192 respondents, 42 percent of total) were asked if they would still have made their trip if they had to either use a shuttle or walk. If respondents had to leave their cars at Camp Richardson and take a free shuttle 58.9 percent would still made the trip to Fallen Leaf Lake, 29.7 would not have made the trip and 11.5 percent said "maybe" they would still have made the trip. If these same respondents could only access the south end of the lake by leaving their car at the north end and walking to the trailhead 61.5 percent would still make the trip, 29.2 percent would not and 9.4 percent said that "maybe" they would still make the trip.

It was postulated that more sightseers surveyed on the way out of the Fallen Leaf Lake area would be willing to have left their car at the north end of the lake than those surveyed on the way in, as the exiting drivers would be aggravated by the congestion they had just experienced. Instead, just the opposite occurred: the proportion of sightseeing drivers willing to leave their car dropped from 32.6 percent surveyed on the way in to 29.2 percent surveyed on the way out. It can be inferred from this that sightseers and trail user drivers do not find the trip to the south end of the lake to be particularly aggravating or that what they had gotten out of the experience overall was worthwhile.

Using the results of the driver surveys and the traffic counts, it is possible to estimate the total number of weekend drivers that would opt to use a parking lot at the north end of Fallen Leaf Lake Road, rather than driving to the south end of the lake. The total number of *potential* diverted drivers per day is estimated to equal 363. Assuming that half of the respondents indicating "maybe" when asked if they would use such a lot actually would use the lot, approximately 206 vehicles would use this lot over a peak day. Conversely, the availability (and knowledge of this availability) of this lot indicates traffic could be reduced on Fallen Leaf Lake Road to the south end of the lake by 206 vehicle round-trips per day, or 412 vehicle one-way trips. Additional analysis would be required to identify the peak number of these vehicles that would use the lot at any one time.

Table 11: Fallen Leaf Lake Road Intercept Survey - Outbound

Page 1 of 2		Percent	
	# of Responses	**Total**	**Valid Responses**
Total Number of Surveys	457	100.0%	100.0%
Vehicle Type:			
Auto (including pickups)	239	52.3%	52.4%
Van	97	21.2%	21.3%
Truck	116	25.4%	25.4%
Auto with boat trailer	1	0.2%	0.2%
Auto with horse trailer	0	0.0%	0.0%
Motorcycle	2	0.4%	0.4%
Tractor	1	0.2%	0.2%
NA	1	0.2%	–
Total	*457*	*100.0%*	*100.0%*
Vehicle Occupancy:			
One	95	20.8%	20.8%
Two	154	33.7%	33.7%
Three	69	15.1%	15.1%
Four	92	20.1%	20.1%
Five	29	6.3%	6.3%
Six	10	2.2%	2.2%
Seven	4	0.9%	0.9%
Eight	0	0.0%	0.0%
Nine	1	0.2%	0.2%
Ten	0	0.0%	0.0%
Eleven	3	0.7%	0.7%
Total	*457*	*100.0%*	*100.0%*
Were you either on a sightseeing trip or using a trail today?			
Yes	198	43.3%	43.4%
No	258	56.5%	56.6%
NA	1	0.2%	–
Total	*457*	*100.0%*	*100.0%*
Trip Purpose:			
Sightseeing Fallen Leaf Lake	85	18.6%	42.5%
Sightseeing Glen Alpine Falls	23	5.0%	11.5%
Hiking/running	37	8.1%	18.5%
Horse trip	3	0.7%	1.5%
Biking	1	0.2%	0.5%
Multiple (usually sightseeing plus other)	47	10.3%	23.5%
Other	4	0.9%	2.0%
NA - Not sightseeing or using trail	257	56.2%	–
Total	*457*	*100.0%*	*100.0%*

Source: Data collected on Saturday, August 16, 1997, between 6:00 AM and 6:00 PM.

Table 13 (continued): Fallen Leaf Lake Road Intercept Survey - Outbound

Page 2 of 2	# of Responses	Percent Total	Percent Valid Responses
The following questions were asked only of persons sightseeing or using a trail:			
If there were a parking area at the north end of Fallen Leaf Lake that provided a view of the lake, would you still have traveled to the south end?			
Yes	44	9.6%	45.4%
No	34	7.4%	35.1%
Maybe	19	4.2%	19.6%
NA - Not sightseeing or using trail	360	78.8%	–
Total	*457*	*100.0%*	*100.0%*
If this parking area required a five-minute walk for a view of the lake, would you still have traveled to the south end?			
Yes	47	10.3%	48.5%
No	32	7.0%	33.0%
Maybe	18	3.9%	18.6%
NA - Not sightseeing or using trail	360	78.8%	–
Total	*457*	*100.0%*	*100.0%*
Would you still have made your trip today if the only way to access the southern end of Fallen Leaf Lake were to leave your car at Camp Richardson and take a free shuttle?			
Yes	113	24.7%	58.9%
No	57	12.5%	29.7%
Maybe	22	4.8%	11.5%
NA - Not sightseeing or using trail	265	58.0%	–
Total	*457*	*100.0%*	*100.0%*
Would you still have made your trip today if the only way to access the south end of Fallen Leaf Lake were to leave your car to the north end of the lake take a water taxi, and then walk to the trailhead?			
Yes	118	25.8%	61.5%
No	56	12.3%	29.2%
Maybe	18	3.9%	9.4%
NA - Not sightseeing or using trail	265	58.0%	–
Total	*457*	*100.0%*	*100.0%*

Source: Data collected on Saturday, August 16, 1997, between 6:00 AM and 6:00 PM.

Parked Vehicle Survey – Postage-paid, self-addressed survey postcards were placed under the windshield wipers of cars parked at public access locations on August 2-3, 1997 at Inspiration Point, Vikingsholm, Glen Alpine Trailhead, Fallen Leaf Lake Marina, and Lily Lake. A total of 233 parking surveys were returned (see Table 13: Parked Vehicle Survey, page 29). The planned stops of respondents included Emerald Bay (37.2 percent), Fallen Leaf Lake (28.5 percent), USFS Visitors Center (10.6 percent), Camp Richardson (9.8 percent), Tallac Historic Site (8.7 percent) and Bliss State Park (5.3 percent). Reported trip purposes included hiking/biking (39.1 percent), sightseeing (37.9 percent), other purpose (10.2 percent), house access (5 percent), camping/backpacking/Desolation Wilderness (4.1 percent), and overnight lodging (3.8 percent). The average number of persons per group was just over three. The average visitor planned to make slightly less than 3.5 stops in the area. The proportion of drivers parking overnight ranged from 14 percent at the trailhead parking to 60 percent at the marina. Of those parking overnight, the average length of stay varied from 5.2 days at Lily Lake to 6.7 days at the Marina. Average length of stay for drivers staying less than a day ranged from 3.5 hours at the trailhead parking to 5.9 hours at Lily Lake. The majority (73.4 percent) of visitors had visited the area before and only 26.6 percent were visiting for the first time. A relatively small percentage (14.6 percent or 34 respondents) were planning to complete a trip around Lake Tahoe on the day they were surveyed.

Respondents indicated where they had come from and were going from the location where they obtained the survey. Answers were varied but have been characterized into percentages utilizing access data for the North Shore and South Shore. This information indicates how transit systems might be designed and operated to successfully replace a trip in a private vehicle. Percentages for South Shore access are the only shown. North Shore bound and unknown destinations are not identified but are nearly the remainder percentage.

Table 12: Percentage of Parked Survey Respondents Coming/Going via South Shore

	Fallen Leaf Locations			Emerald Bay Locations	
	Trailhead	Lily Lake	Marina	Inspiration Point	Vikingsholm Parking
Came from South Shore	88%	80%	78%	69%	48%
Going to South Shore	82%	75%	87%	75%	46%

Parking surveys also requested opinions regarding traffic flow, traffic safety, parking availability and perceived crowdedness. In general, the opinion of traffic flow was mostly good or fair (37.8 and 44.2 percent respectively) with a lower percentage reporting poor or very poor (12 and 6 percent respectively). The same was true of reported opinions of traffic safety with mostly positive opinions (30 percent good, 46.4 percent fair) and fewer poor (17.2 percent) or very poor (6.4 percent) responses. The opinion of parking availability however was substantially lower, with 22.3 percent responding “good”, 29.2 percent fair, 24.9 percent poor and 23.6 percent very poor. Vikingsholm parkers had especially low opinion of the parking availability with a combined total of 63.2 reporting opinions of poor or very poor. The opinions regarding perceived crowdedness were distributed with 47.1 percent stating fair, 22.9 percent good, 18.5 percent poor and 11.5 percent very poor.

Table 13: Parked Vehicle Survey

AUGUST 2 & 13TH, 1997	Parking Survey Location											
	Inspiration		Vikingsholm		Trailhead		Marina		Lily Lake		Total	
	#	%	#	%	#	%	#	%	#	%	#	%
Planned Stops During Trip												
Fallen Leaf Lake	8	13.3%	14	9.0%	17	68.0%	22	48.9%	41	56.9%	102	28.5%
Bliss State Park	3	5.0%	11	7.1%	0	0.0%	2	4.4%	3	4.2%	19	5.3%
USFS Visitors Park	7	11.7%	16	10.3%	0	0.0%	4	8.9%	11	15.3%	38	10.6%
Emerald Bay	30	50.0%	88	56.4%	3	12.0%	5	11.1%	7	9.7%	133	37.2%
Camp Richardson	7	11.7%	15	9.6%	1	4.0%	5	11.1%	7	9.7%	35	9.8%
Tallac Historic Site	5	8.3%	12	7.7%	4	16.0%	7	15.6%	3	4.2%	31	8.7%
	60	*100.0%*	*156*	*100.0%*	*25*	*100.0%*	*45*	*100.0%*	*72*	*100.0%*	*358*	*100.0%*
Trip Purpose												
Sightseeing	25	43.1%	73	43.5%	6	24.0%	10	33.3%	16	25.8%	130	37.9%
Access House	2	3.4%	13	7.7%	0	0.0%	0	0.0%	2	3.2%	17	5.0%
Hiking/Biking	18	31.0%	63	37.5%	11	44.0%	6	20.0%	36	58.1%	134	39.1%
Overnight Lodging	3	5.2%	5	3.0%	0	0.0%	3	10.0%	2	3.2%	13	3.8%
Camping/Backpacking/Desolation	5	8.6%	7	4.2%	0	0.0%	0	0.0%	2	3.2%	14	4.1%
Other	5	8.6%	7	4.2%	8	32.0%	11	36.7%	4	6.5%	35	10.2%
	58	*100.0%*	*168*	*100.0%*	*25*	*100.0%*	*30*	*100.0%*	*62*	*100.0%*	*343*	*100.0%*
Average Number in Party	3.2		3.3		2.2		3.7		3.2		3.1	
Average Planned Number of Visits	7.3		1.6		1.4		4.0		2.6		3.4	
Percent Staying Overnight		63%		66%		14%		60%		33%		47%
Average Length of Stay												
Hours (Drivers Staying Less Than 1 Day)	3.7	Hours	4.6	Hours	3.5	Hours	4.5	Hours	5.9	Hours	4.4	Hours
Days (Drivers Staying Overnight)	3.0	Days	2.6	Days	4.7	Days	6.7	Days	5.2	Days	4.4	Days
Have you visited this area before?												
Yes	27	67.5%	79	76.0%	12	70.6%	14	60.9%	39	79.6%	171	73.4%
No	13	32.5%	25	24.0%	5	29.4%	9	39.1%	10	20.4%	62	26.6%
	40	*100.0%*	*104*	*100.0%*	*17*	*100.0%*	*23*	*100.0%*	*49*	*100.0%*	*233*	*100.0%*
Are you planning on completing a trip around Lake Tahoe today?												
Yes	9	22.5%	21	19.6%	0	0.0%	0	0.0%	4	8.0%	34	14.6%
No	31	77.5%	86	80.4%	15	100.0%	21	100.0%	46	92.0%	199	85.4%
	40	*100.0%*	*107*	*100.0%*	*15*	*100.0%*	*21*	*100.0%*	*50*	*100.0%*	*233*	*100.0%*
Opinion: Traffic Flow												
Good	20	50.0%	42	39.6%	3	21.4%	3	13.0%	20	40.0%	88	37.8%
Fair	20	50.0%	48	45.3%	7	50.0%	11	47.8%	17	34.0%	103	44.2%
Poor	0	0.0%	11	10.4%	4	28.6%	4	17.4%	9	18.0%	28	12.0%
Very Poor	0	0.0%	5	4.7%	0	0.0%	5	21.7%	4	8.0%	14	6.0%
	40	*100.0%*	*106*	*100.0%*	*14*	*100.0%*	*23*	*100.0%*	*50*	*100.0%*	*233*	*100.0%*
Opinion: Traffic Safety												
Good	23	57.5%	31	29.2%	3	21.4%	5	21.7%	8	16.0%	70	30.0%
Fair	15	37.5%	56	52.8%	6	42.9%	11	47.8%	20	40.0%	108	46.4%
Poor	1	2.5%	15	14.2%	5	35.7%	4	17.4%	15	30.0%	40	17.2%
Very Poor	1	2.5%	4	3.8%	0	0.0%	3	13.0%	7	14.0%	15	6.4%
	40	*100.0%*	*106*	*100.0%*	*14*	*100.0%*	*23*	*100.0%*	*50*	*100.0%*	*233*	*100.0%*
Opinion: Parking Availability												
Good	13	32.5%	13	12.3%	2	13.3%	7	30.4%	17	34.7%	52	22.3%
Fair	14	35.0%	26	24.5%	7	46.7%	8	34.8%	13	26.5%	68	29.2%
Poor	8	20.0%	32	30.2%	6	40.0%	3	13.0%	9	18.4%	58	24.9%
Very Poor	5	12.5%	35	33.0%	0	0.0%	5	21.7%	10	20.4%	55	23.6%
	40	*100.0%*	*106*	*100.0%*	*15*	*100.0%*	*23*	*100.0%*	*49*	*100.0%*	*233*	*100.0%*
Opinion: Perceived Crowdedness												
Good	9	23.7%	19	18.4%	3	21.4%	6	26.1%	15	30.6%	52	22.9%
Fair	15	39.5%	43	41.7%	10	71.4%	13	56.5%	26	53.1%	107	47.1%
Poor	12	31.6%	22	21.4%	1	7.1%	1	4.3%	6	12.2%	42	18.5%
Very Poor	2	5.3%	19	18.4%	0	0.0%	3	13.0%	2	4.1%	26	11.5%
	38	*100.0%*	*103*	*100.0%*	*14*	*100.0%*	*23*	*100.0%*	*49*	*100.0%*	*227*	*100.0%*

Source: Returned survey cards from August 2 & 3, 1997.

Emerald Bay

Physical Characteristics: Emerald Bay

Available Parking Spaces. The number of formal and informal parking spaces is identified by subarea for the Emerald Bay area (see Table 14*:* Emerald Bay Parked Vehicle Counts – Weekday, page 32 and Table 15: Emerald Bay Parked Vehicle Counts – Weekend, page 33). Formal parking spaces are those that are striped. Informal parking spaces are determined by using a measuring wheel to measure the length of shoulder available for parallel parking, and estimate the number of spaces by dividing by 22 feet per space. For informal areas where drivers park head-in, the perimeter of the area is measured and divided by 10 feet per space. It was determined that the Emerald Bay area has a total of 498 parking spaces, consisting of 166 formal and 332 informal spaces.

Area Activity Characteristics: Emerald Bay

Visitation Data at USFS Trailheads – Day use permits by trailhead (Glen Alpine, Tallac, Bayview and Eagle Falls) were gathered for 1992 (see Table 3**:** Day Use Permits by Trailhead, page 14). Day use permits peak from May until September for all four trailheads. The Eagle Falls trailhead had the highest use with 3,658 day use permits completed for the year (1992). The Bayview trailhead generated 1,719 day use permits for the year.

Existing Travel Data: Emerald Bay

Existing Roadway Vehicle Movement: A road tube (pneumatic tube counter) was installed at Fallen Leaf Lake Road, Tahoe Mountain Road, Fallen Leaf Lake Campground, Vista Point and Vikingsholm to count two-way traffic (see Table 6: Total 2-Way Traffic Counts, page 17). Counts in the Emerald Bay area show the highest traffic with two-way traffic ranging from 3,985 at Vikingsholm to 4,892 at Vista Point within the 24-hour period.

Accident Data – Accident data was collected from the El Dorado County Sheriff's Department for 1990 through 1997 (see Table 7: Accident Data, 1990-97, page 17). The total number of incidents on Highway 89 was reported as 119 for the seven-year period. Highway 89 incidents consisted of 34 percent (41 incidents) due to unsafe speed, 16 percent (19 incidents) other hazard, 13 percent (15 incidents) wrong side, 12 percent (14 incidents) alcohol/drug related, and the remainder falling within categories with less than ten incidents (not driver-related, R-O-W auto, improper driving, improper turn, unknown, improper pass, hazardous parking, pedestrian violation, or following too close). Annually, there were an average of seventeen accidents on Highway 89 through the area.

Vehicle Travel Time – A key issue regarding the provision of transit services will be the actual travel time during congested conditions. On both a weekday and a weekend day during the peak summer period, a TRPA staff member drove between Camp Richardson and the Vikingsholm parking lot to mark the travel times to the nearest minute (see Table 16: Travel Times for Emerald Bay - Weekday, page 34, and Table 17: Travel Times for Emerald Bay - Weekend, page 35). Travel times on Highway 89 averaged 13 minutes on a weekday and between 13 and 14 minutes on the weekend. Travel speed ranged from 27.8 - 28.2 miles per hour on the weekday to 27.5 - 28.9 miles per hour on the weekend.

Parked Vehicle Counts -- Hourly counts of the number of parked vehicles in various subareas of the Emerald Bay area were taken on a Saturday and peak season weekday (see Table 14*:* Emerald Bay Parked Vehicle Counts – Weekday, page 32, and Table 15: Emerald Bay Parked Vehicle Counts – Weekend, page 33). Parked vehicle counts as compared to the hour determine

parking capacity during the week and on the weekend. The Emerald Bay area totaled 63.5 percent of total capacity (190.4 percent of legal spaces) during the week and 78.5 percent (235.5 percent of legal spaces) during the weekend. On the weekend, a high of 391 vehicles was counted at 1:00 P.M (see Figure 7 and Figure 8, page 36). On both the observed weekday and weekend day, parked vehicles peaked at around the noon hour.

Traveler Characteristics: Emerald Bay

Parked Vehicle Survey -- Postage-paid, self-addressed postcards were placed under the windshield wipers of cars parked at public access locations on August 2-3, 1997 at Inspiration Point, Vikingsholm, Glen Alpine Trailhead, Fallen Leaf Lake Marina, and Lily Lake. A total of 233 parking surveys were returned (see Table 13: Parked Vehicle Survey, page 29). Parkers not planning to stay in the area overnight consisted of 66 percent of all respondents at Vikingsholm, and 63 percent at Inspiration Point. Of those staying less than a day, the average length of stay was 4.6 hours at Vikingsholm and 3.7 hours at Inspiration point, while the average length of stay for drivers parked overnight was 2.6 days at Vikingsholm and 3.0 days at Inspiration Point. Vikingsholm parkers had especially low opinion of the parking availability, with a combined total of 63.2 reporting opinions of poor or very poor. The opinions regarding perceived crowdedness were distributed with 47.1 percent stating fair, 22.9 percent good, 18.5 percent poor and 11.5 percent very poor.

Emerald Bay Tram – The Emerald Bay Tram proved to be a valuable resource during the summer of 1997 because of the limited number of parking areas and spaces and increased traffic in the Emerald Bay area. Emerald Bay Tram riders were surveyed on August 10, 14, 21 and 27, 1997, between 10:00 A.M. and 4:30 P.M. (see Table 18: Emerald Bay Tram On-Board Survey, page 37). Of the 44 riders surveyed, all were waiting to board the tram at Camp Richardson. 90.9 percent of surveyed riders were overnight visitors to the Tahoe Basin, 4.5 percent were full time residents, 2.3 percent were seasonal residents and 2.3 percent day visitors. All of the riders were staying in the South Lake Tahoe area. The largest proportion of traveling groups (50 percent) had two people in the party. Perception of the Tram service was found to be very positive, with 62.2 percent stating that they found the service to be very good, followed by 24.3 percent good, 8.1 percent average and 5.4 percent poor. Most of the riders were sightseeing (94.7 percent) followed by 2.6 percent accessing a trailhead and 2.6 percent going shopping. When asked how they got to the tram, 43.2 percent indicated that they rode the Trolley, 29.7 percent walked, 21.6 percent drove and 5.4 percent stated “other.” All but one of the respondents (97.7 percent) chose Emerald Bay as their destination. Over half (59.1 percent) of the riders planned to reboard the Tram later, while 40.9 percent were riding round-trip.

Table 14: Emerald Bay Parked Vehicle Counts – Weekday

Weekday

Location	Number of Parking Spaces			8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	Max. Observed Usage	
	Formal	Informal	Total												Formal Spaces	Total Spaces
P.O. TAYLOR CREEK, BEFORE BRIDGE - LFT. SD.	0	3	3	0	1	2	1	0	1	1	1	0	2	0	–	66.7%
PARKING AREA @ CHAINS REQUIRED SIGN	0	8	8	0	0	0	0	0	1	0	0	0	0	0	–	12.5%
SPRING CREEK PARKING AREA	23	12	35	25	24	21	23	18	19	23	18	18	19	16	108.7%	71.4%
P.O. AT END OF HAIRPIN - GOOD VIEWS	0	4	4	0	1	1	1	0	2	2	0	0	1	0	–	50.0%
EMERALD BAY STATE PARK, PARKING LOT	0	14	14	0	2	5	2	4	1	4	3	1	4	1	–	35.7%
EMERALD BAY CAMPGROUND PARKING	0	105	105	99	75	58	39	29	34	42	44	58	71	70	–	94.3%
VISTA POINT - BLUE SIGN	0	6	6	0	2	0	1	0	0	0	1	0	0	0	–	33.3%
BAYVIEW PARKING - RT. AND LFT. SD.	0	25	25	0	2	3	12	9	8	10	4	2	0	0	–	48.0%
INSPIRATION POINT	21	0	21	3	7	21	20	20	18	22	15	17	10	5	104.8%	104.8%
BAYVIEW CAMPGROUND AND TRAILHEAD PARKING	24	30	54	15	20	24	34	32	33	32	23	21	16	17	141.7%	63.0%
PARKIING AFTER INS PT. RT. AND LFT SD. - GATED	0	6	6	0	0	3	1	2	4	2	1	0	0	0	–	66.7%
P.O. BEFORE ROCK SLIDE (DANGEROUS)	0	8	8	0	0	0	3	0	1	3	0	0	0	0	–	37.5%
P.O. AT ROCK SLIDE - RT. SD. - GOOD VIEWS	0	3	3	1	0	1	1	2	1	1	1	0	1	1	–	66.7%
P.O. AFTER SLIDE - RT. SD.	0	7	7	0	0	0	7	7	5	3	2	0	0	0	–	100.0%
ALONG ROCK WALL - BOTH SIDES	0	20	20	0	0	0	3	9	9	3	4	0	0	0	–	45.0%
EAGLE FALLS TRAIHEAD SIGN - LONG STRETCH	0	42	42	0	1	6	36	38	26	29	22	11	4	4	–	90.5%
EAGLE FALLS - PAID PARKING	34	0	34	12	20	34	35	36	36	36	28	17	14	13	105.9%	105.9%
EAGLE FALLS PARKING AREA - NOT PAID - LFT. SD.	0	28	28	10	22	25	27	27	25	28	25	19	20	16	–	100.0%
VIKINGSHOLM PARKING LOT	64	11	75	5	29	68	70	72	72	73	69	52	31	17	114.1%	97.3%
HOURLY TOTAL	**166**	**332**	**498**	**170**	**206**	**272**	**316**	**305**	**296**	**314**	**261**	**216**	**193**	**160**	190.4%	63.5%

Source: Data collected Thursday, July 31, 1997.

Table 15: Emerald Bay Parked Vehicle Counts – Weekend

Weekend

Location	Number of Parking Spaces			8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	Max. Observed Usage	
	Formal	Informal	Total												Formal Spaces	Total Spaces
P.O. TAYLOR CREEK, BEFORE BRIDGE - LFT. SD.	0	3	3	0	0	1	0	2	0	0	1	2	0	0	–	66.7%
PARKING AREA @ CHAINS REQUIRED SIGN	0	8	8	0	0	0	0	1	0	0	1	0	0	1	–	12.5%
SPRING CREEK PARKING AREA	23	12	35	33	34	32	28	28	27	28	29	22	17	16	147.8%	97.1%
P.O. AT END OF HAIRPIN - GOOD VIEWS	0	4	4	0	0	1	2	3	2	1	2	1	0	0	–	75.0%
EMERALD BAY STATE PARK, PARKING LOT	0	14	14	1	0	2	4	2	12	5	2	1	1	0	–	85.7%
EMERALD BAY CAMPGROUND PARKING	0	105	105	105	98	89	54	43	39	46	51	67	70	73	–	100.0%
VISTA POINT - BLUE SIGN	0	6	6	1	0	1	1	1	2	1	0	1	0	0	–	33.3%
BAYVIEW PARKING - RT. AND LFT. SD.	0	25	25	2	5	6	16	23	20	6	4	1	0	0	–	92.0%
INSPIRATION POINT	21	0	21	5	16	20	24	22	24	17	22	21	18	10	114.3%	114.3%
BAYVIEW CAMPGROUND AND TRAILHEAD PARKING	24	30	54	43	50	48	52	54	59	40	31	23	28	20	245.8%	109.3%
PARKIING AFTER INS PT. RT. AND LFT SD. - GATED	0	6	6	0	0	1	1	1	10	2	2	1	2	0	–	166.7%
P.O. BEFORE ROCK SLIDE (DANGEROUS)	0	8	8	0	1	0	4	2	1	1	0	0	0	0	–	50.0%
P.O. AT ROCK SLIDE - RT. SD. - GOOD VIEWS	0	3	3	1	2	1	1	0	2	0	1	2	2	0	–	66.7%
P.O. AFTER SLIDE - RT. SD.	0	7	7	0	0	0	0	4	3	1	0	1	0	0	–	57.1%
ALONG ROCK WALL - BOTH SIDES	0	20	20	0	0	0	1	1	10	3	2	3	3	1	–	50.0%
EAGLE FALLS TRAIHEAD SIGN - LONG STRETCH	0	42	42	4	6	10	37	45	41	34	22	19	6	5	–	107.1%
EAGLE FALLS - PAID PARKING	34	0	34	21	25	34	34	35	34	28	24	14	14	11	102.9%	102.9%
EAGLE FALLS PARKING AREA - NOT PAID - LFT. SD.	0	28	28	10	27	27	28	28	31	30	26	21	19	17	–	110.7%
VIKINGSHOLM PARKING LOT	64	11	75	14	44	67	75	73	74	75	67	65	38	18	117.2%	100.0%
HOULY TOTAL	**166**	**332**	**498**	**240**	**308**	**340**	**362**	**368**	**391**	**318**	**287**	**265**	**218**	**172**	235.5%	78.5%

Source: Data collected Sunday, July 27, 1997.

Table 16: Travel Times for Emerald Bay - Weekday

		Pass																
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	**Average**
ROADWAY TIMES																		
ENTERING																		
Camp Richardson		10:00 AM	10:29 AM	11:00 AM	11:31 AM	12:02 PM	12:34 PM	1:09 PM	1:39 PM	2:10 PM	2:46 PM	3:17 PM	3:47 PM	4:18 PM	4:47 PM	5:16 PM	5:42 PM	–
Fallen Leaf Lake Road		10:01 AM	10:32 AM	11:01 AM	11:33 AM	12:04 PM	12:36 PM	1:10 PM	1:41 PM	2:14 PM	2:47 PM	3:19 PM	3:49 PM	4:20 PM	4:48 PM	5:17 PM	5:44 PM	–
Cascade Road		10:05 AM	10:36 AM	11:05 AM	11:37 AM	12:08 PM	12:40 PM	1:14 PM	1:45 PM	2:18 PM	2:51 PM	3:23 PM	3:53 PM	4:24 PM	4:53 PM	5:21 PM	5:48 PM	–
St. Park Campground		10:08 AM	10:39 AM	11:09 AM	11:41 AM	12:12 PM	12:43 PM	1:17 PM	1:48 PM	2:21 PM	2:54 PM	3:27 PM	3:56 PM	4:28 PM	4:56 PM	5:24 PM	5:51 PM	–
Inspiration Point		10:11 AM	10:41 AM	11:11 AM	11:43 AM	12:14 PM	12:45 PM	1:20 PM	1:51 PM	2:24 PM	2:56 PM	3:29 PM	3:58 PM	4:30 PM	4:58 PM	5:26 PM	5:53 PM	–
Vikingsholm Parking Lot		10:13 AM	10:44 AM	11:14 AM	11:45 AM	12:17 PM	12:47 PM	1:22 PM	1:53 PM	2:27 PM	2:59 PM	3:31 PM	4:00 PM	4:33 PM	5:00 PM	5:28 PM	5:55 PM	–
LEAVING																		
Vikingsholm Parking Lot		10:15 AM	10:46 AM	11:15 AM	11:47 AM	12:19 PM	12:49 PM	1:25 PM	1:55 PM	2:30 PM	3:02 PM	3:32 PM	4:03 PM	4:34 PM	5:01 PM	5:29 PM	5:56 PM	–
Inspiration Point		10:17 AM	10:48 AM	11:18 AM	11:50 AM	12:21 PM	12:52 PM	1:28 PM	1:58 PM	2:33 PM	3:05 PM	3:35 PM	4:05 PM	4:36 PM	5:03 PM	5:31 PM	5:58 PM	–
St. Park Campground		10:19 AM	10:50 AM	11:20 AM	11:52 AM	12:24 PM	12:54 PM	1:30 PM	2:00 PM	2:35 PM	3:07 PM	3:37 PM	4:07 PM	4:38 PM	5:05 PM	5:33 PM	6:00 PM	–
Cascade Road		10:22 AM	10:53 AM	11:23 AM	11:55 AM	12:27 PM	12:57 PM	1:33 PM	2:03 PM	2:39 PM	3:10 PM	3:40 PM	4:11 PM	4:41 PM	5:09 PM	5:36 PM	–	–
Fallen Leaf Lake Road		10:26 AM	10:57 AM	11:27 AM	11:59 AM	12:31 PM	1:01 PM	1:37 PM	2:07 PM	2:43 PM	3:14 PM	3:44 PM	4:15 PM	4:45 PM	5:13 PM	5:40 PM	–	–
Camp Richardson		10:28 AM	10:59 AM	11:29 AM	12:01 PM	12:33 PM	1:03 PM	1:38 PM	2:09 PM	2:45 PM	3:16 PM	3:46 PM	4:17 PM	4:46 PM	5:15 PM	5:41 PM	–	–
TRAVEL TIMES																		
ENTERING																		
Camp Richardson		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Fallen Leaf Lake Road		0:01	0:03	0:01	0:02	0:02	0:02	0:01	0:02	0:04	0:01	0:02	0:02	0:02	0:01	0:01	0:02	**0:01**
Cascade Road		0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:05	0:04	0:04	**0:04**
St. Park Campground		0:03	0:03	0:04	0:04	0:04	0:03	0:03	0:03	0:03	0:03	0:04	0:03	0:04	0:03	0:03	–	**0:03**
Inspiration Point		0:03	0:02	0:02	0:02	0:02	0:02	0:03	0:03	0:03	0:02	0:02	0:02	0:02	0:02	0:02	–	**0:02**
Vikingsholm Parking Lot		0:02	0:03	0:03	0:02	0:03	0:02	0:02	0:02	0:03	0:03	0:02	0:02	0:03	0:02	0:02	–	**0:02**
Total Travel Time		*0:13*	*0:15*	*0:14*	*0:14*	*0:15*	*0:13*	*0:13*	*0:14*	*0:17*	*0:13*	*0:14*	*0:13*	*0:15*	*0:13*	*0:12*	–	***0:13***
LEAVING																		
Vikingsholm Parking Lot		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Inspiration Point		0:02	0:02	0:03	0:03	0:02	0:03	0:03	0:03	0:03	0:03	0:03	0:02	0:02	0:02	0:02	0:02	**0:02**
St. Park Campground		0:02	0:02	0:02	0:02	0:03	0:02	0:02	0:02	0:02	0:02	0:02	0:02	0:02	0:02	0:02	0:02	**0:02**
Cascade Road		0:03	0:03	0:03	0:03	0:03	0:03	0:03	0:03	0:04	0:03	0:03	0:04	0:03	0:04	0:03	–	**0:03**
Fallen Leaf Lake Road		0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	–	**0:04**
Camp Richardson		0:02	0:02	0:02	0:02	0:02	0:02	0:01	0:02	0:02	0:02	0:02	0:02	0:01	0:02	0:01	–	**0:01**
Total Travel Time		*0:13*	*0:13*	*0:14*	*0:14*	*0:14*	*0:14*	*0:13*	*0:14*	*0:15*	*0:14*	*0:14*	*0:14*	*0:12*	*0:14*	*0:12*	–	***0:13***
SPEED (MILES/HOUR)	**DISTANCE**																	
ENTERING	(Miles)																	
Camp Richardson	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Fallen Leaf Lake Road	0.87	52.2	17.4	52.2	26.1	26.1	26.1	52.2	26.1	13.1	52.2	26.1	26.1	26.1	52.2	52.2	26.1	**34.5**
Cascade Road	2.10	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	25.2	31.5	31.5	**31.1**
St. Park Campground	1.50	30.0	30.0	22.5	22.5	22.5	30.0	30.0	30.0	30.0	30.0	22.5	30.0	22.5	30.0	30.0	–	**27.5**
Inspiration Point	0.75	15.0	22.5	22.5	22.5	22.5	22.5	15.0	15.0	15.0	22.5	22.5	22.5	22.5	22.5	22.5	–	**20.5**
Vikingsholm Parking Lot	1.16	34.8	23.2	23.2	34.8	23.2	34.8	34.8	34.8	23.2	23.2	34.8	34.8	23.2	34.8	34.8	–	**30.2**
Average Speed	*6.38*	*29.4*	*25.5*	*27.3*	*27.3*	*25.5*	*29.4*	*29.4*	*27.3*	*22.5*	*29.4*	*27.3*	*29.4*	*25.5*	*29.4*	*31.9*	–	***27.8***
LEAVING																		
Vikingsholm Parking Lot	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Inspiration Point	1.16	34.8	34.8	23.2	23.2	34.8	23.2	23.2	23.2	23.2	23.2	23.2	34.8	34.8	34.8	34.8	34.8	**29.0**
St. Park Campground	0.75	22.5	22.5	22.5	22.5	15.0	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	**22.0**
Cascade Road	1.50	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	22.5	30.0	30.0	22.5	30.0	22.5	30.0	–	**28.5**
Fallen Leaf Lake Road	2.10	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	–	**31.5**
Camp Richardson	0.87	26.1	26.1	26.1	26.1	26.1	26.1	52.2	26.1	26.1	26.1	26.1	26.1	52.2	26.1	52.2	–	**31.3**
Average Speed	*6.38*	29.4	29.4	27.3	27.3	27.3	27.3	29.4	27.3	25.5	27.3	27.3	27.3	31.9	27.3	31.9	–	***28.2***

Source: Data collected on Thursday, July 24, 1997.

Table 17: Travel Times for Emerald Bay - Weekend

		Pass															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Average
ROADWAY TIMES																	
ENTERING																	
Camp Richardson		10:00 AM	10:32 AM	11:02 AM	11:33 AM	12:04 PM	12:36 PM	1:11 PM	1:51 PM	2:30 PM	3:03 PM	3:37 PM	4:22 PM	4:50 PM	5:21 PM	5:47 PM	–
Fallen Leaf Lake Road		10:01 AM	10:35 AM	11:04 AM	11:35 AM	12:06 PM	12:38 PM	1:13 PM	1:53 PM	2:33 PM	3:05 PM	3:39 PM	4:24 PM	4:54 PM	5:22 PM	5:48 PM	–
Cascade Road		10:06 AM	10:38 AM	11:07 AM	11:39 AM	12:10 PM	12:42 PM	1:17 PM	1:57 PM	2:36 PM	3:08 PM	3:43 PM	4:28 PM	4:57 PM	5:26 PM	5:52 PM	–
St. Park Campground		10:10 AM	10:42 AM	11:11 AM	11:42 AM	12:13 PM	12:45 PM	1:21 PM	2:02 PM	2:40 PM	3:11 PM	3:46 PM	4:31 PM	5:01 PM	5:29 PM	5:55 PM	–
Inspiration Point		10:13 AM	10:44 AM	11:13 AM	11:44 AM	12:16 PM	12:47 PM	1:23 PM	2:05 PM	2:42 PM	3:13 PM	3:48 PM	4:33 PM	5:04 PM	5:31 PM	5:57 PM	–
Vikingsholm Parking Lot		10:16 AM	10:46 AM	11:16 AM	11:47 AM	12:18 PM	12:50 PM	1:25 PM	2:08 PM	2:45 PM	3:15 PM	3:50 PM	4:35 PM	5:06 PM	5:33 PM	6:00 PM	–
LEAVING																	
Vikingsholm Parking Lot		10:18 AM	10:48 AM	11:18 AM	11:49 AM	12:22 PM	12:57 PM	1:29 PM	2:16 PM	2:48 PM	3:18 PM	3:52 PM	4:36 PM	5:07 PM	5:35 PM	–	–
Inspiration Point		10:21 AM	10:50 AM	11:21 AM	11:51 AM	12:24 PM	12:59 PM	1:32 PM	2:19 PM	2:51 PM	3:21 PM	3:55 PM	4:38 PM	5:09 PM	5:37 PM	–	–
St. Park Campground		10:23 AM	10:52 AM	11:23 AM	11:53 AM	12:26 PM	1:01 PM	1:34 PM	2:21 PM	2:53 PM	3:23 PM	3:57 PM	4:40 PM	5:11 PM	5:39 PM	–	–
Cascade Road		10:26 AM	10:55 AM	11:26 AM	11:56 AM	12:29 PM	1:04 PM	1:37 PM	2:24 PM	2:56 PM	3:26 PM	4:00 PM	4:44 PM	5:14 PM	5:42 PM	–	–
Fallen Leaf Lake Road		10:30 AM	10:59 AM	11:30 AM	12:00 PM	12:32 PM	1:08 PM	1:41 PM	2:27 PM	2:59 PM	3:30 PM	4:03 PM	4:47 PM	5:18 PM	5:45 PM	–	–
Camp Richardson		10:31 AM	11:01 AM	11:32 AM	12:02 PM	12:35 PM	1:10 PM	1:43 PM	2:29 PM	3:02 PM	3:35 PM	4:05 PM	4:49 PM	5:20 PM	5:46 PM	–	–
TRAVEL TIME																	
ENTERING																	
Camp Richardson		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Fallen Leaf Lake Road		0:01	0:03	0:02	0:02	0:02	0:02	0:02	0:02	0:03	0:02	0:02	0:02	0:04	0:01	0:01	0:02
Cascade Road		0:05	0:03	0:03	0:04	0:04	0:04	0:04	0:04	0:03	0:03	0:04	0:04	0:03	0:04	0:04	0:03
St. Park Campground		0:04	0:04	0:04	0:03	0:03	0:03	0:04	0:05	0:04	0:03	0:03	0:03	0:04	0:03	0:03	0:03
Inspiration Point		0:03	0:02	0:02	0:02	0:03	0:02	0:02	0:03	0:02	0:02	0:02	0:02	0:03	0:02	0:02	0:02
Vikingsholm Parking Lot		0:03	0:02	0:03	0:03	0:02	0:03	0:02	0:03	0:03	0:02	0:02	0:02	0:02	0:02	0:03	0:02
Total Travel Time		*0:16*	*0:14*	*0:14*	*0:14*	*0:14*	*0:14*	*0:14*	*0:17*	*0:15*	*0:12*	*0:13*	*0:13*	*0:16*	*0:12*	*0:13*	*0:14*
LEAVING																	
Vikingsholm Parking Lot		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Inspiration Point		0:03	0:02	0:03	0:02	0:02	0:02	0:03	0:03	0:03	0:03	0:03	0:02	0:02	0:02	–	0:02
St. Park Campground		0:02	0:02	0:02	0:02	0:02	0:02	0:02	0:02	0:02	0:02	0:02	0:02	0:02	0:02	–	0:02
Cascade Road		0:03	0:03	0:03	0:03	0:03	0:03	0:03	0:03	0:03	0:03	0:03	0:04	0:03	0:03	–	0:03
Fallen Leaf Lake Road		0:04	0:04	0:04	0:04	0:03	0:04	0:04	0:03	0:03	0:04	0:03	0:03	0:04	0:03	–	0:03
Camp Richardson		0:01	0:02	0:02	0:02	0:03	0:02	0:02	0:02	0:03	0:05	0:02	0:02	0:02	0:01	–	0:02
Total Travel Time		*0:13*	*0:13*	*0:14*	*0:13*	*0:13*	*0:13*	*0:14*	*0:13*	*0:14*	*0:17*	*0:13*	*0:13*	*0:13*	*0:11*	–	0:13
SPEED (MILES/HOUR)	**DISTANCE**																
ENTERING	(Miles)																
Camp Richardson	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Fallen Leaf Lake Road	0.87	52.2	17.4	26.1	26.1	26.1	26.1	26.1	26.1	17.4	26.1	26.1	26.1	13.1	52.2	52.2	29.3
Cascade Road	2.10	25.2	42.0	42.0	31.5	31.5	31.5	31.5	31.5	42.0	42.0	31.5	31.5	42.0	31.5	31.5	34.6
St. Park Campground	1.50	22.5	22.5	22.5	30.0	30.0	30.0	22.5	18.0	22.5	30.0	30.0	30.0	22.5	30.0	30.0	26.2
Inspiration Point	0.75	15.0	22.5	22.5	22.5	15.0	22.5	22.5	15.0	22.5	22.5	22.5	22.5	15.0	22.5	22.5	20.5
Vikingsholm Parking Lot	1.16	23.2	34.8	23.2	23.2	34.8	23.2	34.8	23.2	23.2	34.8	34.8	34.8	34.8	34.8	23.2	29.4
Average Speed	*6.38*	*23.9*	*27.3*	*27.3*	*27.3*	*27.3*	*27.3*	*27.3*	*22.5*	*25.5*	*31.9*	*29.4*	*29.4*	*23.9*	*31.9*	*29.4*	*27.5*
LEAVING																	
Vikingsholm Parking Lot	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
Inspiration Point	1.16	23.2	34.8	23.2	34.8	34.8	34.8	23.2	23.2	23.2	23.2	23.2	34.8	34.8	34.8	–	29.0
St. Park Campground	0.75	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	–	22.5
Cascade Road	1.50	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	22.5	30.0	30.0	–	29.5
Fallen Leaf Lake Road	2.10	31.5	31.5	31.5	31.5	42.0	31.5	31.5	42.0	42.0	31.5	42.0	42.0	31.5	42.0	–	36.0
Camp Richardson	0.87	52.2	26.1	26.1	26.1	17.4	26.1	26.1	26.1	17.4	10.4	26.1	26.1	26.1	52.2	–	27.5
Average Speed	*6.38*	*29.4*	*29.4*	*27.3*	*29.4*	*29.4*	*29.4*	*27.3*	*29.4*	*27.3*	*22.5*	*29.4*	*29.4*	*29.4*	*34.8*	–	*28.9*

Source: Data collected on Saturday, August 9, 1997.

Figure 7: Emerald Bay Parked Vehicle Counts - Weekday

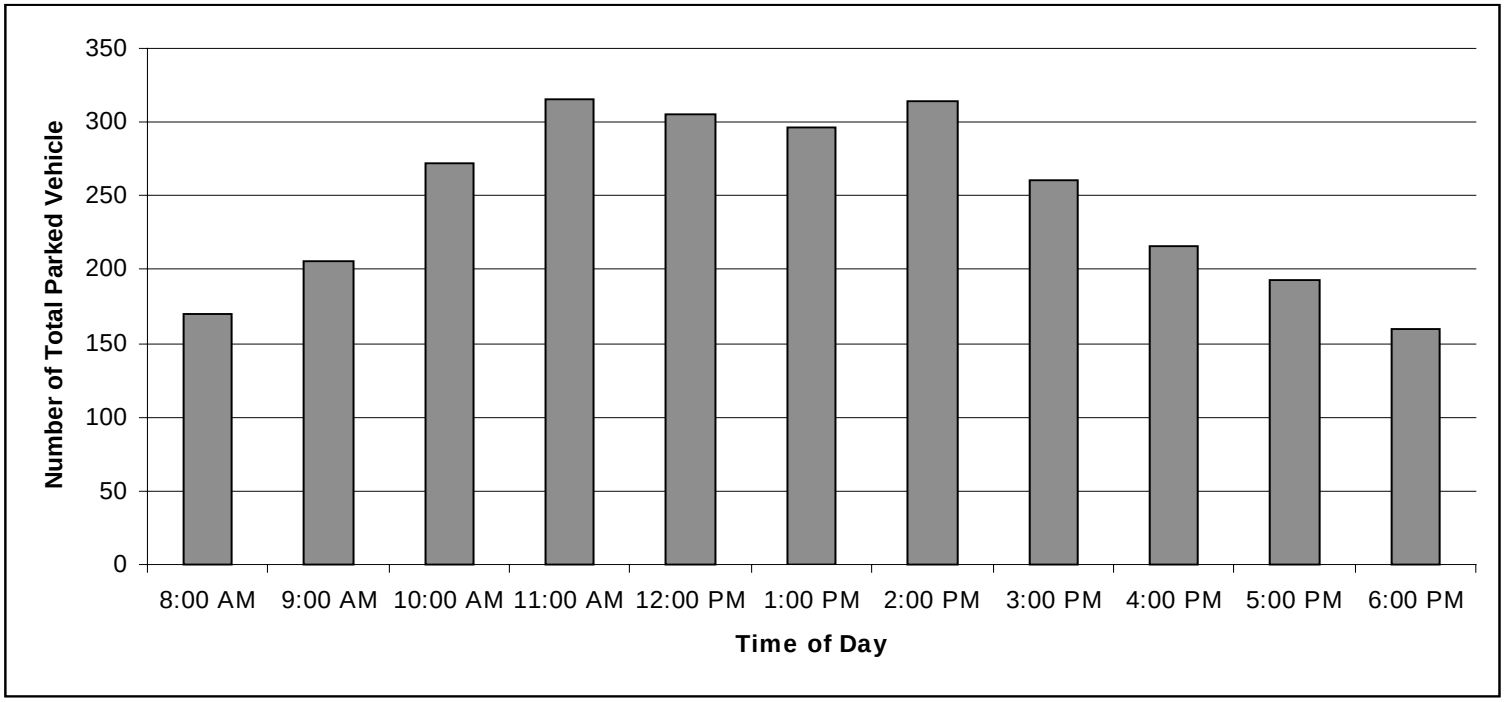


Figure 8: Emerald Bay Parked Vehicle Counts - Weekend

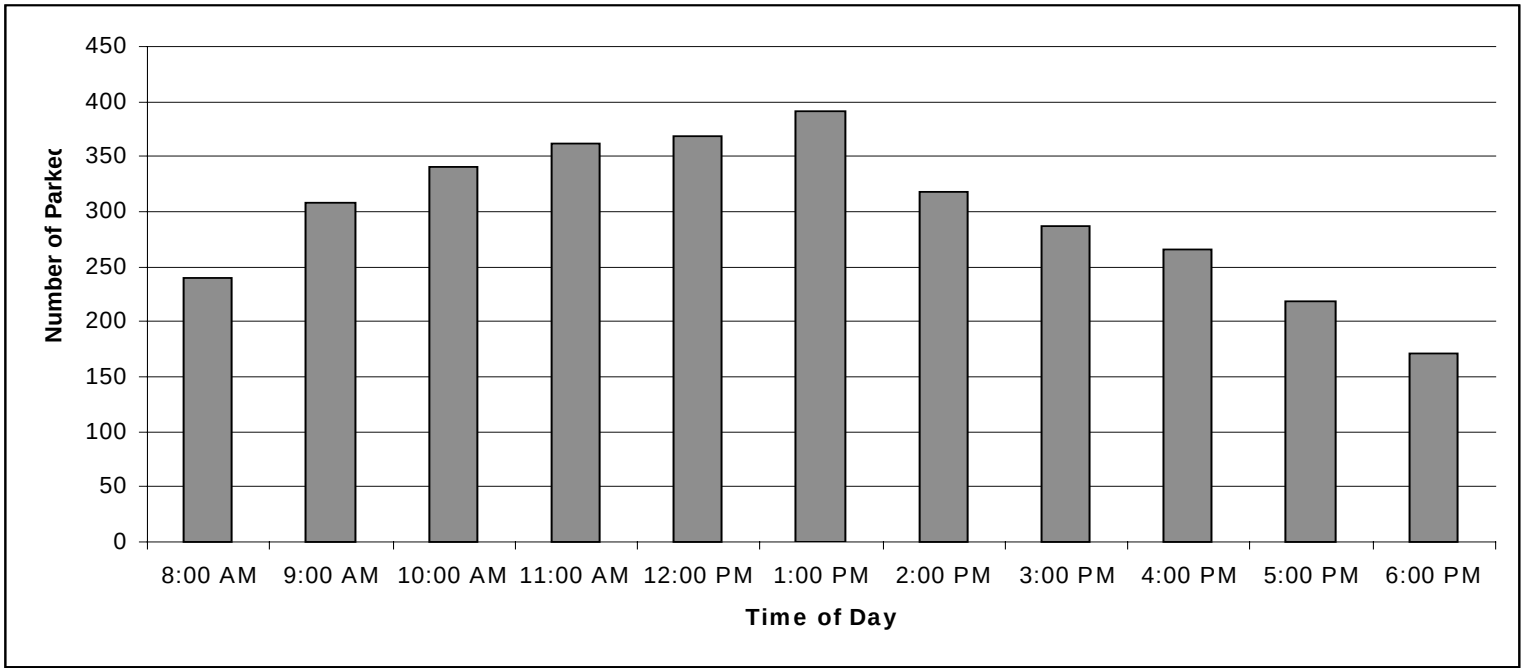


Table 18: Emerald Bay Tram On-Board Survey

	# of Responses	Percent	
		Total	Valid Responses
Total Number of Surveys	44	100.0%	100.0%
Locations			
Camp Richardson	44	100.0%	100.0%
Resident Status			
Full time resident	2	4.5%	4.5%
Seasonal resident	1	2.3%	2.3%
Day visitor	1	2.3%	2.3%
Overnight visitor	40	90.9%	90.9%
Total	*44*	*100.0%*	*100.0%*
Number in Party			
One	5	11.4%	11.4%
Two	22	50.0%	50.0%
Three	4	9.1%	9.1%
Four	8	18.2%	18.2%
Five	1	2.3%	2.3%
Six	1	2.3%	2.3%
Seven	0	0.0%	0.0%
Eight	3	6.8%	6.8%
Total	*44*	*100.0%*	*100.0%*
In what town are you staying?			
South Lake Tahoe	44	100.0%	100.0%
What is your perception of the Tram service?			
Very Good	23	52.3%	62.2%
Good	9	20.5%	24.3%
Average	3	6.8%	8.1%
Poor	2	4.5%	5.4%
NA	7	15.9%	–
Total	*44*	*100.0%*	100.0%
Trip Purpose			
Sightseeing	36	81.8%	94.7%
Get to trailhead	1	2.3%	2.6%
Shopping	1	2.3%	2.6%
NA	6	13.6%	–
Total	*44*	*100.0%*	100.0%
How did you get to the Tram?			
Drove	8	18.2%	21.6%
Trolley	16	36.4%	43.2%
STAGE	0	0.0%	0.0%
Bicycle	0	0.0%	0.0%
Walk	11	25.0%	29.7%
Other	2	4.5%	5.4%
NA	7	15.9%	–
Total	*44*	*100.0%*	*100.0%*
Destination			
Eagle Falls	1	2.3%	2.3%
Emerald Bay	43	97.7%	97.7%
Total	*44*	*100.0%*	*100.0%*
Will you get off the Tram and reboard on a later run, or ride round-trip?			
Reboard later	26	59.1%	59.1%
Ride round-trip	18	40.9%	40.9%
Total	*44*	*100.0%*	*100.0%*

Source: Data collected August 10th, 14th, 21st, and 27th, 1997 from 10:00 AM to 4:30 PM.

Summary of Data Collection

From the collected data, a variety of travel and use pattern characteristics for Fallen Leaf Lake and Emerald Bay become apparent. For the ease of understanding the data, Table 19: Summary of Collected Data is provided on page 39. Understanding the data provides better understanding of the transportation situation at Fallen Leaf Lake and Emerald Bay.

Fallen Leaf Lake

From a traditional transportation engineering perspective, data collected at Fallen Leaf Lake does not indicate an extreme problem. Significant traffic delays when large vehicles and high volumes of vehicles pass through the narrowest section of Fallen Leaf Road (between Emigrant Road and the Marina) do occur but were not experienced during the two survey dates. The greatest delay experienced (4 minutes over the entire route above the average travel time) was reported during the peak hours along the narrowest section of roadway.

Residents at Fallen Leaf Lake, in general, have a stronger negative opinion of traffic congestion than do visitors. Data indicates that visitors perceive some traffic flow, traffic safety, parking, and crowding problems, but the majority are satisfied with their experience at Fallen Leaf Lake, including the driving and parking situation. About 70% of the parkers at the trailheads and 61% at the Marina have visited their destination previously, suggesting that the majority of people know and accept the traffic conflicts along the roadway.

However, based on the inbound and outbound surveys, a majority of visitors hiking, backpacking, or sightseeing indicated they would use a shuttle if such a system were provided. In real world situations, positive survey response to this question has been shown to be much higher that actual shuttle ridership.

Emerald Bay

Both observation over time and the data collected indicate that the parking supply at Emerald Bay is very poorly matched with the parking demand. Especially on the weekends but also in most locations on the weekday, parking demand causes spillover from the formal paved parking areas into informal locations. This situation degrades soil stability, water quality, and the quality of the recreational experience at Emerald Bay. Of all the parked survey responses, parking availability was the highest negative response (at 54.7%) at any of the survey sites, including Fallen Leaf Lake. Indications are that either more (formal) parking is demanded or that an alternative means of accessing Emerald Bay (a shuttle) should be encouraged through means of incentives and/or disincentives. The lack of parking management in the popular Emerald Bay area has lead to the negative parking perception by the public and the environmental degradation of perhaps the most popular outdoor destination at Lake Tahoe.

Travel patterns to Emerald Bay suggest that the visitation ratio from South Shore to North Shore is about 60:40 with more North Shore patronage to attractions on the north side of Emerald Bay. Interestingly, 20% of the visitors indicated that the visit to Emerald Bay was part of their stop on a day trip around Lake Tahoe. Solutions aimed towards shifting access towards a shuttle mode should account for the origin/destination characteristics of Emerald Bay visitors.

Table 19: Summary of Collected Data

Data Category	Fallen Leaf Lake Data Summary	Emerald Bay Data Summary
Parked Vehicle Counts	▪ There is inadequate formal parking between the Marina and the Lily Lake parking lot. ▪ Parking use peaks between Noon and 2 PM. ▪ Most parking areas are full on the weekend.	▪ There is inadequate formal parking between Emerald Bay Campground and the Vikingsholm parking lot. ▪ Parking use peaks between 11 AM and 2 PM. ▪ At all formal parking areas, parking demand exceeds supply and on weekends, demand exceeds supply in most informal parking areas.
Trailhead Use	▪ As expected, trailhead use peaks from June to September with highest use in July/August. ▪ Nearly all trail users enter and return on the same trail.	▪ As expected, trailhead use peaks from June to September with highest use in July/August ▪ Nearly all trail users enter and return on the same trail.
24 Hour Two-Way Traffic Counts	▪ The average traffic count south of Tahoe Mountain Road was 1,385 and 1,367 south of the Fallen Leaf Campground. ▪ The average traffic count for Fallen Leaf Road on Saturday was 1,330, lower than the Sunday average of 1,421. ▪ Due to the nature of the roadway, the two-way traffic volumes can be halved to obtain approximate one-way volumes	▪ The average traffic count east of the Emerald Bay Vista point was 4,700 and 4,182 east of the Vikingsholm parking lot. ▪ Traffic volumes through Emerald Bay include through traffic as well as traffic stopping at Emerald Bay locations.
Peak Hour	▪ As obtained from the inbound and outbound surveys, the peak hour (2 PM to 3 PM) accounts for 9.4% of the 24-hour traffic volumes, although from 12 PM to 4 PM traffic levels are very close to the peak hour.	▪ Caltrans data indicates the peak hour is approximately 14.4% of the 24-hour traffic volumes. Indications from the parking data are that the peak periods are between 11 AM and 2 PM.
Travel Times	▪ On weekdays and weekends, travel time averaged 22 and 25 minutes respectively. ▪ The longest time period in either direction was 29 minutes (on the weekend) indicating no periods of delay on either survey day was experienced.	▪ On weekdays and weekends, travel time averaged 13 and 14 minutes respectively. ▪ The longest time period in either direction was 17 minutes.
Vehicle Occupancy	▪ Average vehicle occupancy was 2.7 people.	▪ Average vehicle occupancy was 2.7 people.
Trip Purposes	▪ Between the inbound and outbound survey, an average of 46.6% of those surveyed were either sightseeing, backpacking, or hiking.	▪ Of those parked in the Emerald Bay locations, over 80% were sightseeing, hiking, or backpacking/camping.
Origin and Destination	▪ Approximately 80% of those surveyed came from or were going to South Shore. ▪ Only 4.8% of the drivers of the parked vehicles at Fallen Leaf Lake were planning on completing a trip around Lake Tahoe.	▪ At Inspiration Point, about 70% were coming/going to South Shore while at Vikingsholm the percentage was about 47%. ▪ For 20% of the drivers of the parked vehicles, Emerald Bay was part of an around Lake Tahoe trip.
Previous Visits	▪ At trailhead locations, over 70% had visited before while at the Marina, 61% had previously visited.	▪ About 73% of the visitors had previously visited Emerald Bay.
Opinions of Parked Vehicle Survey Respondents	▪ 29.8% felt traffic flow was poor or very poor. ▪ 39.0% felt traffic safety was poor or very poor. ▪ 38.3% felt parking availability was poor or very poor. ▪ 15.1% felt crowding was poor or very poor.	▪ 15.1% felt traffic flow was poor or very poor. ▪ 14.3% felt traffic safety was poor or very poor. ▪ 54.7% felt parking availability was poor or very poor. ▪ 39.0% felt crowding was poor or very poor.

Criteria for Assessing the Alternatives

When the alternatives are discussed, they can be evaluated in terms of criteria applicable to the problems identified as well as their consistency with regional plans and policies. For the most part, the criteria are described according to the ability to minimize problems. The following criteria are used to assess performance of each alternative.

Reduces Vehicle Conflict

More applicable to Fallen Leaf Lake, vehicle conflicts between large vehicles and different vehicle types (automobiles, bicycles, trucks) are a measure of the types of vehicles, the roadway characteristics, and the volume of vehicles in a given time period. Given the data, quantitative assessment of this criteria is measured through reduction in traffic volume (the data collected does not help predict how often vehicle conflicts occur).

Reduces Traffic Volumes to Operational Capacity

The measure of road capacity to the volume it carries is characterized in terms of level of service in a typical transportation study. This criterion is applicable to Fallen Leaf Lake. For this study, the capacity of the roadway has not been established but based on indications from the travel times, delay sometimes results due to the volume and/or type of vehicles travelling through the narrower sections of the road. Reduction in traffic volume in this case is relative to the daily traffic volume measured in the data collection period of this study. This criterion is expressed in a percentage volume reduction over the daily two-way traffic volume. Reduction in traffic volume does not guarantee that conflicts will never occur in the future, simply that the likelihood or severity of the conflict will be reduced when volumes are reduced.

Matches Parking Demand with Parking Supply

Parking supply for both Fallen Leaf Lake and Emerald Bay is a matter of the physical supply and the intended supply provided by the land management agency. The intended supply represents the formal paved delineated parking locations where the physical supply includes that as well as the pullout, compacted areas where vehicles park when the formal supply is exceed. For reasons of water quality, as well as aesthetics, TRPA's Regional Plan discourages parking in unpaved areas. This criterion is a relative measure among the alternatives in relation to matching intended supply with the parking demanded.

Cost of the Alternative

Cost of the alternatives includes both the capital costs for infrastructure and the maintenance and operations costs for yearly maintenance.

Reduces Auto Dependency

A regional transportation goal established in the TRPA Compact is to reduce dependency upon the automobile. The alternatives are evaluated for their effectiveness in supporting this goal.

Benefits TRPA Environmental Thresholds

Complete environmental documentation would be required to assess the alternatives objectively against the established environmental thresholds established by TRPA. This criterion is a relative

measure among each alternative in moving toward threshold attainment for all categories of environmental quality.

Complexity of Implementation

This criterion is ranked high, medium, or low according to the complexity of implementation. If an alternative requires legislation and extensive coordination among land management agencies, local government, and private stakeholders, it will receive a high ranking. A low ranking would involve minimal coordination and implementation effort.

Cost/Benefit Ratio

For Fallen Leaf Lake alternatives, the cost/benefit ratio is expressed via the cost of the alternative to the volume reduction benefit. For Emerald Bay, the cost/benefit ratio is the cost of the alternative compared to the reduction in vehicles parking at Emerald Bay locations. For Emerald Bay, this does not include the environmental benefits of reducing parking demand.

Increase in Visitor Travel Time

For Fallen Leaf Lake, especially, but also Emerald Bay, the average visitor travel times remain fairly consistent throughout the day. A significant increase in travel time can deter visitors from making a trip via shuttle that took less time in their own private vehicle. In addition, increasing travel times for visitors while residents may enjoy a decrease in travel times can be an issue of complex public policy. Measurement of this criterion is in estimated average increased travel time over the existing condition.

Alternatives

For both locations, alternatives were developed which are aimed toward minimizing transportation problems. Alternatives that did not preserve the existing access characteristics for both public and private entities were considered unacceptable for inclusion in this study. An example of such an alternative would be one that limited or restricted public access over current levels to the hiking trails located at the south end of Fallen Leaf Road or one that prohibited both resident and visitor vehicle traffic at all times except via a shuttle. Alternatives were developed based off of concepts discussed beginning in 1993 with stakeholders in both locations. TRPA staff considered the introduced concepts and assembled the feasible ones into alternatives based on the solving the identified transportation problems. Other locations and experiences inside and outside the Lake Tahoe Basin were also applied to the development of the alternatives.

Although it is not organized as a formal environmental analysis for TRPA, National Environmental Protection Act, or the California Environmental Quality Act, the inclusion of a “no action” alternative as a consideration in addition to other alternatives is included. Each study area and the alternatives are discussed separately; however, implementation of many of these alternatives can not exist in a vacuum that addresses only their specific needs. Design of alternatives that ignore the transportation relationships to other nearby areas, such as Camp Richardson, would bifurcate demonstrated transportation linkages. To the extent possible, given that this study did not address a wider range of transportation hubs, the development of alternatives relies upon previous studies, observation, and qualitative data for other nearby transportation influence areas such as Camp Richardson.

The text that follows describes the general nature of the alternative while the effects and infrastructure needs of that alternative for signage, transit systems, and the like will be included in the analysis. At the end of this section, summarizes the alternatives.

Fallen Leaf Lake

Eight alternatives have been developed for Fallen Leaf Lake. Each alternative is listed and given a brief summation. Each of the eight alternatives is evaluated in the transportation analysis section of this study. In all alternatives, regular maintenance of Fallen Leaf Road is identified as an assumed condition. This includes repair of pavement, filing of potholes, and installation of Best Management Practices along the roadway.

“No Action” Alternative

No modifications to Fallen Leaf Road, no transportation controls, and no transit operations are proposed. The transportation situation at Fallen Leaf Lake remains as it is and is subject to fluctuations in use patterns that occur over time.

Expansion of the Coordinated Transit System Alternative

In this alternative, service to Fallen Leaf Lake is provided by expansion of South Lake Tahoe’s planned Coordinated Transit System (CTS). CTS is designed as a demand responsive service although for Fallen Leaf Lake, two appropriately sized transit vehicles operating on hour fixed headways is planned. Camp Richardson is used as a transfer location from the CTS service that serves the south shore of Lake Tahoe. No additional parking in the Fallen Leaf service area, including at Camp Richardson is proposed. To encourage ridership, the shuttle driver would conduct a narrated tour of the travel route. In general, transit benefits under this alternative would come from those who know of and choose the option to utilize transit at Fallen Leaf. The fare

would be transferable between the rest of the CTS service area and according to the CTS rate schedule.

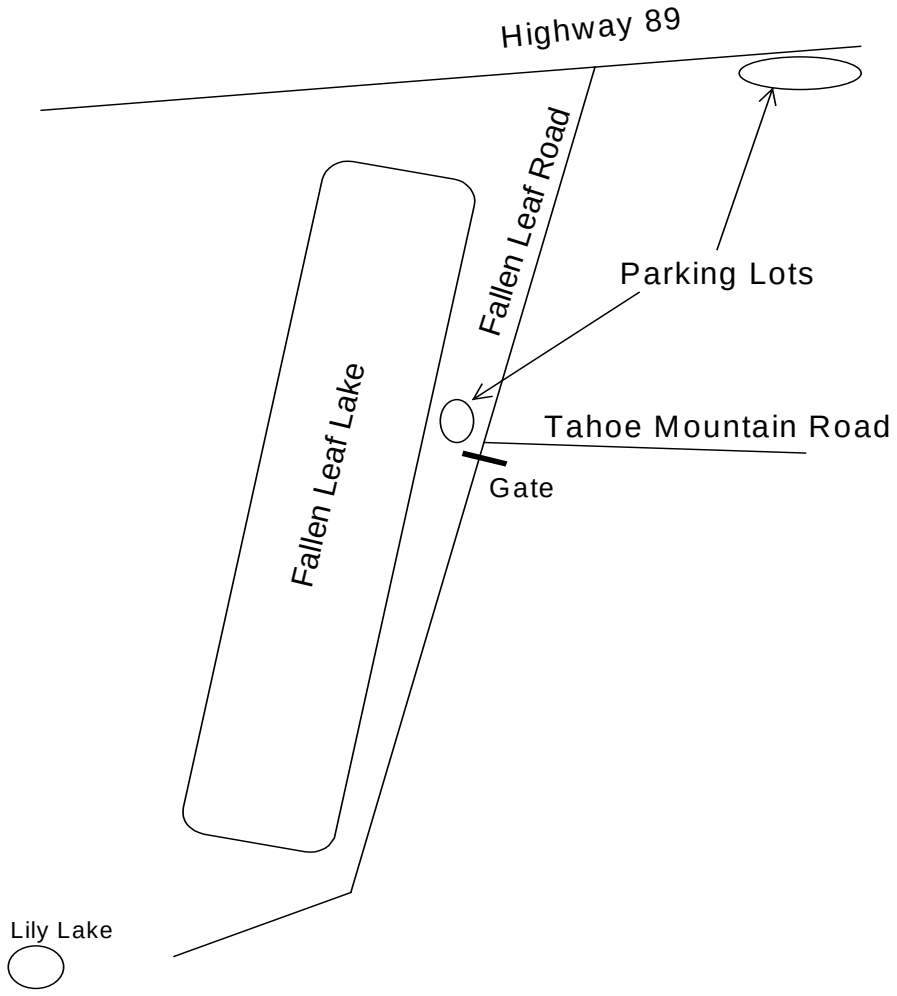
"Devils Postpile" Shuttle Alternative

Near Mammoth Lakes, California, the US Forest service operates a mandatory shuttle system in the Devil's Postpile National Monument area. Similar to Fallen Leaf Lake, the road is narrow and twisting. There are trip purposes in that area (e.g., boating, horseback riding) where private vehicles are let through but the majority of trip purposes must take place via the shuttle. This alternative is modeled after that system.

A staffed gated entry/exit system would be required just south of the Fallen Leaf Road and Tahoe Mountain Road intersection. A small parking area adjacent to the entry point would be constructed primarily for Tahoe Mountain Road traffic. A much larger parking lot would be required near the S.R. Highway 89 and Fallen Leaf Road intersection, either at the intersection or more closely associated with the Camp Richardson/Valhalla visitor areas. Signing explaining restrictions along the southern portions of Fallen Leaf Road and the shuttle system would be included at traditional Fallen Leaf Lake entry points, including Tahoe Mountain Road. Staffing from 9:00 A.M. to 4:00 P.M. from Memorial Day to Labor Day at the entry/exit gate is required to adequately filter out groups or individuals whose trip purposes are appropriate for continuing on in their private vehicle. For a location map of the proposed elements of this alternative, refer to Figure 9: "Devils Postpile" Alternative Schematic Map, page 44. The concentration of applicable trip purposes to be captured on the shuttle is higher during that period demonstrating that extending the staffing time would have diminishing returns. Parking data that indicates that most parking occurs from 11 AM to 4 PM further supporting the hours of gate operation.

Examples of vehicles that could pass are residents, boat launchers, construction vehicles, commercial vehicles, guests of residences, and Stanford Camp bound visitors. All trips for sightseeing, hiking, and backpacking require utilizing the shuttle system. The shuttle system would operate as at least two appropriately sized transit vehicles operating on half-hour fixed headways. There is no fare to use the transit system. Parking fees (assumed $5/vehicle) at both parking locations are planned. Shuttle connections to the south shore CTS system will be made similar to those proposed in the CTS alternative.

Figure 9: “Devils Postpile” Alternative Schematic Map



Parking Control with Shuttle Alternative

Parking for all vehicles in the various Fallen Leaf parking from the Church parking south to the Lily Lake formal parking area would be limited to parking to those in paved, striped areas (i.e., formal parking areas). This removes 35 informal spaces from the available parking pool. No pullout, side of the road, or unpaved parking will be allowed. Enforcement of the parking restrictions will be required. At designated parking areas, $5/vehicle fees will be assessed. A free shuttle system (two appropriately sized transit vehicles operating on hour fixed headways) will be provided similar to the Devil's Postpile Alternative. Additional parking for shuttle users will be required at locations near the Tahoe Mountain Road intersection and in the S.R. Highway 89/Camp Richardson area.

In this alternative, it is extremely important that information regarding parking space availability is passed to drivers before they get to the south end of Fallen Leaf Lake and begin to search for spaces. The most difficult obstacle this alternative has is over coming the need to accurately provide information regarding parking fees and parking availability in response to fluctuating demand throughout the day. This will require changeable signage both at the Fallen Leaf Road and S.R. Highway 89 intersection and at some point along Tahoe Mountain Road (from the inbound survey, Tahoe Mountain Road access for the purposes sightseeing, hiking, or backpacking is only about 4% of all the traffic that continues to the south end of the Lake). Accurate parking information will be required at these locations to indicate whether or not utilizing the shuttle is a necessity. Regardless of the information it is expected that some drivers will ignore the warnings and proceed. Therefore it is imperative that the parking information be accurate and current. For the first few years, initial implementation of this alternative may require hiring and individual to monitor parking and update the parking information signs. In future years, enough information may be known so that permanent signage may indicate when the parking facilities are typically full. This information will be necessary shift those trip purposes to the shuttle.

Parking/Viewing Area Construction at North End of Fallen Leaf Lake Alternative

No shuttle is proposed under this alternative. Instead, construction of an appropriately sized parking lot and an ability to view Fallen Leaf Lake is proposed. The intention of this alternative is to capture, on a voluntary basis, the sightseers who would be just as satisfied viewing the lake from the north end as from the south end, thereby reducing some roadway congestion. Specific locations for this lot are not suggested under this proposal as that is beyond the scope of this study. Suffice it to say that in the north end of Fallen Leaf Lake, there are significant cultural, environmental, and possible US Forest Service management conflicts which could alter the feasibility and/or function of this alternative. No restrictions or parking controls along Fallen Leaf Road or the present day parking areas are proposed.

Parking Prohibition with Shuttle

This alternative involves prohibition of all public parking south of the Marina location to Lily Lake from Memorial Day to Labor Day. In conjunction with that prohibition, a shuttle system for all visitor trips for sightseeing, hiking, and backpacking will be provided free of charge. Signage will indicate that prohibition at Fallen Leaf Road and SR 89 and also before descending Tahoe Mountain Road to Fallen Leaf Road. A free parking lot located near the Fallen Leaf Road and SR 89 intersection (perhaps closer to Camp Richardson) would be signed as the location to park for all visitor trips. For the purposes of not impacting the Marina, limited Marina use only public parking would be provided but on a validation system to ensure compliance. Enforcement of the parking prohibition for the Lily Lake and other informal parking areas will be carried out.

North End Parking and Water Taxi Service Alternative

Similar to the previous alternative, this alternative involves construction of a parking facility on the north end and development of a pier/docking facility for operation of a water taxi service to the south end of Fallen Leaf Lake. This alternative would require a larger parking facility and more facility development than in the previous alternative, primarily due to the presumed attractiveness of the water taxi service. Fees for the water taxi are assumed to be $2/person. Although the attraction of a water taxi ride may counter this to some degree, the fee, as discussed in the analysis of this alternative, is a deterrent to its use. As a comparison, the fee for the Fallen Leaf Water Taxi will be significantly less than the fee charged at Echo Lakes for a similar water taxi system that mostly shuttles backpackers along the length of the lake thus shortening their hike.

Under this alternative people destined for the hiking trails at the south end of Fallen Leaf Lake would be left well short of the start of the trailhead. In order to maintain convenient access to public lands, the hiking trails, a van shuttle program would be required to get hikers to the trailhead or sightseeing locations. The cost for this van shuttle would be included in the water taxi fee. The same and even greater land use and environmental conflicts anticipated in the previous alternative are expected with this development of this alternative. Assessment of these impacts is not part of this study.

"Rules of the Road" with Pullouts Alternative

A less intensive alternative which is primarily aimed at addressing extreme congestion problems is to add signage at the entry points to Fallen Leaf Lake and along Fallen Leaf Road that addresses right-of-way rules that allows southbound oncoming traffic priority. The signs near the entrance to Fallen Leaf Road would describe the narrowness of the road and suggest that large vehicles do not travel it while the remaining signs would address the right-of-way rules, yielding to southbound traffic. This alternative does not address parking except indirectly due to the effect signage may have. In specific locations, signing and paving of existing compacted dirt pullouts is included to facilitate traffic flow and compliance with the signed "rules of the road". This alternative may be combined with the CTS alternative and Parking Control with Shuttle alternative.

Emerald Bay

Emerald Bay presents a less complicated scenario than Fallen Leaf Lake and consequently three alternatives are identified for the area.

"No Action" Alternative

No modifications to Emerald Bay, no transportation controls, and no modifications to the 1997 service level of the Emerald Bay Shuttle are proposed. This alternative includes the planned shuttle service to Inspiration Point from the North Shore Trolley service. The transportation situation and, most notably, the parking at Emerald Bay remains as it is (including the US Forest Service fee demo program at Eagle Falls) and is subject to fluctuations in use patterns that occur over time.

Increase Emerald Bay Shuttle Service Alternative

During the summer of 1997, the first year of the Emerald Bay Shuttle service, one shuttle vehicle provided access between Camp Richardson and the Vikingsholm parking lot. This alternative involves adding one additional shuttle to the route so that service levels are improved. In 1997, the one shuttle required some down time both at Camp Richardson and Vikingsholm. Half-hour headways can be achieved using this scheme. The fee for riding the shuttle is $2/person. This

alternative includes the planned shuttle service to Inspiration Point from the North Shore Trolley service. No parking management is proposed under this alternative except the US Forest Service fee demo at Eagle Falls.

Parking Management and Increased Shuttle Service Alternative

This alternative utilizes the transit service described above with parking management at Emerald Bay. Parking management in this alternative includes enforcement of parking in designated locations (i.e., paved and striped parking areas), and $5/vehicle parking fees in those locations. Shuttle service will be provided from the Camp Richardson/Valhalla location for no charge. Reductions in parking at the Emerald Bay locations plus the orientation toward the shuttle service will require provision of parking at Camp Richardson/Valhalla. This alternative includes the planned shuttle service to Inspiration Point from the North Shore Trolley service. Signing approaching Emerald Bay from the north and south would attest to the limited parking opportunities in the area. This alternative closely mimics California State Parks plans.

Alternative Elements Common to Fallen Leaf Lake and Emerald Bay

The Transportation and Water Quality Coalition, representing business, environmental, and governmental interests, has proven an effective discussion and planning group for environmental improvements at Lake Tahoe. Recently, the Coalition is focussing its efforts on addressing transportation along the SR 89 corridor, including parking management. Without question, transportation issues at Fallen Leaf Lake and Emerald Bay must be considered in plans for SR 89 that will be developed with the guidance of the Coalition. For this reason, when parking facilities are proposed, the exact location and amount of parking should be considered with respect to the solutions derived from the planning process for the SR 89 corridor.

For the purposes of this study, the Camp Richardson area has been identified as the central hub for parking and transit for Fallen Leaf Lake and Emerald Bay for access via South Lake Tahoe. Access to these sites via North Shore will require coordination with potential parking and transit locations at Homewood and the planned Tahoe City Intermodal Transit Center. Implementation of any one of the alternatives will require coordination with the SR 89 planning efforts organized by the Coalition. If there is one common derivative of this study it is that implementation an alternative identified in this study or in a future analysis for SR 89 must be planned with a SR 89 corridor transit and parking management solution.

The parking management required under a comprehensive SR 89 corridor plan should be designed such that it enhances transit operations. Common parking areas that would also be the main transit hubs for access to attractions along the S.R. 89 corridor seem to be common objectives and support the transit and parking management plans in alternatives of this study. Construction of a transit terminal would encourage a smoother transition between parking and transit operations, both of which should be designed so transit is the encourage mode of transportation to various attractions.

Another important consideration is corridor access planning. Providing shuttle service to these areas is not only a need from the South Shore, although that is where the bulk of visitation to these areas begins and ends. Based on the survey from parked respondents, approximately 20% indicated that their trip started and finished from destinations via the North Shore of Lake Tahoe. At the Vikingsholm parking area, approximately half of the respondents were from the North Shore. This data indicates that for any of the shuttle alternatives to function, connection to shuttle/transit service from the North Shore is a necessity. In the summer of 1998, trolley service from the North Shore will be accessing Inspiration Point. From that point, it will be possible to transfer to the Emerald Bay shuttle and continue to Camp Richardson and pay the boarding fee

and board the South Shore trolley service. The alternatives that utilize shuttle service to Fallen Leaf Lake and Emerald Bay through a common system assume that connectivity to the North Shore Trolley will be maintained.

Table 20: Summary of Alternatives

FALLEN LEAF LAKE ALTERNATIVES	# of Transit Vehicles	Parking Spaces Suggested	Enforcement Component (Y/N)	Charging Parking (P) or Transit (T)	Type of Alternative	Description
No Action	-	-	-	-	No Control	No action taken.
Coordinated Transit System	2	-	N	T	No Control	Fixed-route transit service is provided.
Devils Postpile Shuttle	3	80	Y	-	Control	A gated entry system requires sightseers, hikers and backpackers to utilize the provided shuttle system.
Parking Control w/Shuttle	2	40	Y	P	Partial Control	A combination of parking removal along with parking fees is used to encourage a mode shift to a shuttle.
Parking Area at North End	-	15	N	-	No Control	A parking area is provided at the north end of Fallen Leaf Lake for sightseers so they do not need to travel to the south end.
Parking Prohibition w/ Shuttle	2	150	Y	-	Control	All public parking for trailheads and visitor attractions is prohibited during the summer months and a shuttle is provided for access to those areas.
North End Parking & Water Taxi	2	80	N	T	No Control	Near the north end, a parking area and docking facility is provided to operate a water taxi that transports visitors to the Marina at the southern end.
"Rules of the Road"	-	-	N	-	No Control	Signage indicates right-of-way rules and suggests that large vehicles do not travel down Fallen Leaf Road.
EMERALD BAY ALTERNATIVES						
No Action	-	-	-	T	No Control	No action taken.
Increase Emerald Bay Shuttle	2	-	N	T	No Control	Another shuttle is added to the existing Emerald Bay Shuttle that improves the service.
Parking Management w/ Shuttle	2	169	Y	P	Partial Control	Dirt parking areas are removed and paid parking is required at all paved locations. Parking rules are enforced and a shuttle system is provided to transport visitors to the Emerald Bay attractions.

Transportation Analysis of Alternatives

Assessments of what the effects of each alternative are focused on data gathered from the surveys conducted during the summer of 1997. Data that is related to the analysis from other sources is included as well.

Analysis of each alternative is presented according to the problems identified for Fallen Leaf Lake and Emerald Bay. No specific problem identified at Fallen Leaf Lake or Emerald Bay is ranked higher than another is because no definitive measure has been identified by stakeholders as more important than another. In addition, neither of these locations lends itself to traditional measurements of transportation performance such as Level of Service (LOS) or average vehicle delay. Rather, the alternatives are compared against each other according to the problems identified according to the location.

Fallen Leaf Lake

None of the alternatives for Fallen Leaf Lake propose capture of all the appropriate trip purposes, but it is useful to examine that potential so that each alternative has some point of comparison. Appropriate trip purposes are those that do not significantly inconvenience the purpose of the trip. For instance, access to one's residence or delivery or work vehicles, by their nature, could not be accomplished feasibly via transit.

Eligible reported trip purposes that could utilize transit are sightseeing, hiking, and backpacking. From the inbound survey, about 50% of day user and some overnight users reported these trip purposes. From the outbound survey, 43% of the users indicated they were either sightseeing or using a trail. The remainders of the trips at the survey checkpoint are trip purposes that would be more difficult to convert into transit trips.

Table 21: Potential Fallen Leaf Lake Trip Purpose Interception Percentage

POTENTIAL VEHICLE TRIPS – INBOUND SURVEY*			OUTBOUND SURVEY*
Day Use	Total Trips	Potential % Transit Riders (Saturday)	Potential % Transit Riders (Saturday)
239	479	49.8%	43.4%

❋ The percentages of potential transit riders includes Stanford Camp guests who departed and arrived on the survey date in their own vehicles, thus skewing the percentage of transit riders lower than would be anticipated if that population was removed from the total trips. Stanford Camp guests typically do not utilize their vehicles during the week. Transit alternatives examine participation of Stanford Camp in a transit program.

Assuming 1,330 two-way vehicle-trips are made during a typical peak Saturday day in August (assumption made from 24 hour vehicle counts), averaging the potential percentage, 620 vehicle-trips could be eliminated from the roadway. Application of the 2.7 persons/vehicle to that figure indicates that the transit system under its maximal trip capturing percentages would require capacity to handle 1,673 persons/day. This estimate represents a potential of daily ridership on a transit system designed to intercept sightseers, hikers, and backpackers and assumes that no additional persons are attracted to the area or discouraged from making the trip.

Allowing for fluctuations, the reduction in traffic volume would be between 40% and 50% meaning that between 550 and 700 vehicles would not be traveling on Fallen Leaf Lake Road (based on the surveyed variations in traffic volume). Corresponding reductions in the number of pullovers

required of northbound and southbound traffic is expected with removal of that volume of vehicles, although transit service along the corridor will absorb some of that reduction.

All the alternatives except the parking prohibition alternative presented below fall short of achieving the vehicle volume reductions represented by “capturing” the sightseer, hiker, and backpacker traffic via transit vehicles. Consideration of alternatives that went beyond capturing these trip types was not deemed feasible for a variety of logistic and social reasons.

Evaluation of the “No Action” Alternative

Taking no action, other than to repair and maintain Fallen Leaf Road, results in very marginal transportation capacity improvements and no improvement to parking at Fallen Leaf Lake. Conflicts described in the problem analysis section of this document will continue and are expected to worsen over time, corresponding with expected regional growth of vehicle-miles-traveled (VMT)[iii]. Anticipated increases in recreational use in the Camp Richardson/Valhalla area are expected to draw greater attention to the attraction of nearby Fallen Leaf Lake, also worsening traffic and parking problems experienced today, however, at some point, Fallen Leaf Road and the parking used by visitors will reach a carrying capacity, if it has not already. This alternative relies upon carrying capacity, be it psychological (visitor and resident experiences degrade so that no more trips are made) or physical (all the parking is full and there is no feasible way to bring more vehicles in the locations demanded) to limit significant growth in traffic volumes. This alternative has no additional costs over present day costs.

Evaluation of the Coordinated Transit System Alternative

If data existed that indicated the mode split of visitor trolley ridership to private vehicle ridership, it could be used to assess the effectiveness of providing visitor trolley service to Fallen Leaf Lake. Ridership over trolley routes in the South Shore area is known. In 1997, in 87 days of operation for the “A” route, 42,770 passengers utilized the trolley service. While ridership varied according to the weekends and weekdays (it averaged 492 people/day), during the Renaissance Fair, held at Camp Richardson, an extensive shuttle program averaged 1,373 people/day on four weekend dates. Demand for the trolleys has climbed ever since the South Shore Transportation Management Association (SS/TMA) initiated the service

On the outbound survey, 42% of the respondents indicated that were sightseeing/using a trail and answered the question, “Would you still have made you trip today if the only way to access the southern end of Fallen Leaf Lake were to leave your car at Camp Richardson and take a free shuttle?” Of those on that trip purpose, 58.9% said “yes”, 29.7% said “no”, and “11.5%” said “maybe”. Assuming half the “maybes” would be a yes, the net percentage that would take a free transit system according to the question was about 30% of all trip purposes. The question, however, was not asked to determine what percentage would ride a transit system were one simply provided as an option, as it is in this alternative.

Historically, transit ridership in South Lake Tahoe accounts for between 1.5% and 3% of total trips. The indications are that at Camp Richardson, because of the visitor oriented trolley systems, the mode split is quite a bit higher that it is within South Lake Tahoe. For the purposes of this analysis, an assumption of a 5% mode split will be utilized to assess provision of a transit service at Fallen Leaf Lake. The recent trends in trolley ridership as well as the positive responses to a shuttle system in the Fallen Leaf surveys suggest that a 5% mode split is not unreasonable. Ridership would be a mixture of trolley passengers from South Shore locations as well as those who have parked their vehicle in the Camp Richardson area. Utilizing an average daily two-way traffic volume of 1,330, 5% of the vehicles represents a reduction of 67 vehicles from the 24-hour count of 1,330. Converting to one-way vehicle trips (by halving) equals 34 less vehicles. At occupancy

rates of 2.7 people/vehicle, this equates to 92 shuttle passengers entering Fallen Leaf Lake (and also returning).

Over time, shuttle ridership could be expected to increase due to two factors. For one, growth in ridership can be expected as word gets out regarding the service. In addition, if additional vehicle pressure and parking demand gets any higher (see the “No Action” Alternative), demand would be forced onto the CTS system. When or if this might occur is not available from the data collected. As a matter of providing the potential for additional capacity, the US Forest Service would be required to be integrally involved in pursuing this alternative. Recreational capacity for the trailheads and other support facilities (restrooms) would need to be considered and fed back into the CTS operational levels.

A five-percent reduction in traffic volumes will have minimal effect on roadway congestion. This alternative is expected to relieve some pressure on parking, if only initially. The trips made via the shuttle are those that are more likely to be hiking, sightseeing, or backpacking. Use of the shuttle for these trip purposes will temporarily reduce the need for 39 parking spaces (assuming an average parking time of 4.6 hours over an 8-hour period). The lack of more intensive transportation control strategies suggests that the minimal reduction in traffic volumes and the relief in parking demand is not sustainable. Exactly how long the benefits of implementing this alternative remain is difficult to discern given the seasonal fluctuations in recreational demand at Lake Tahoe. It is certain, however, that with this alternative, the capacity to bring people to the recreational attractions of Fallen Leaf Lake has increased. Based on the response to crowding, most visitors in the parking survey (see Table 13: Parked Vehicle Survey, page 29) indicated that perception of crowdedness was in the good to fair range. It is unclear if the additional capacity afforded by this alternative would affect the perception of crowdedness. The US Forest Service would need to become a partner in the CTS shuttle service and assure that the combination of shuttle service and current parking demand is matched by trailhead capacity.

During the peak hour period, capacity for 9 persons (one-way) would be required of the shuttle system. The shuttle size demanded would be two 15-passenger wheelchair equipped vans. No additional parking is proposed under this alternative. Two benches, one at or near the Camp Richardson connection area and one at Lily Lake will be required. Stops at Lily Lake, Glen Alpine Falls, Stanford Camp, the Marina, Fallen Leaf Campground, and Camp Richardson will be made each requiring signage. If the service proves to be popular, larger capacity vans would be required or an additional van would be necessary. Vehicles wider than a van will have a difficult time navigating the narrower sections of the shuttle service area.

Implementation costs for this alternative are included in APPENDIX B. The cost/benefit ratio for this alternative, based on the established criteria, is not high because there are no elements of it that require shuttle ridership and corresponding vehicle volume decreases. The function of Fallen Leaf Road is expected to stay similar to the “No Action” Alternative although the operation of the shuttle does provide the opportunity for additional visitors in the visitor areas (trailheads, Marina, etc.).

From a policy standpoint, this alternative does not require that any Fallen Leaf user group, residents or visitors, experience any travel delay over what is experienced presently. Those wishing to utilize transit can expect a longer trip time but are presumed to be willing to make that tradeoff in favor of the benefits of utilizing the shuttle.

The North Shore Trolley service (beginning in 1998) will provide a means of accessing Fallen Leaf Lake by transit from the North Shore via the Emerald Bay shuttle that connects to the shuttle service under this alternative near the Camp Richardson area.

Evaluation of the "Devil's Postpile" Shuttle Alternative

The alternative is designed to eliminate the vehicle trips made along Fallen Leaf Road, for sightseeing, hiking, or backpacking reasons. The net effect of removing these trip types was evaluated previously under the assumption that all of these trip types could be captured. The "Devil's Postpile" Alternative comes close to capturing these trips but the hours of operation for the gated entry mean that, based on the inbound survey, about 70% of the vehicle trips occur during the period when Fallen Leaf Road is "filtered" for the trip types past the gate. During the time the road is gated, examining the inbound survey data revealed that approximately 50% of the trips during that period would be trips subject to riding on the shuttle. The inbound survey responses indicated that 30% of the respondents (respondents to the question already indicated that their trip purpose was appropriate to shuttle use) would ride the shuttle if it was free. The difference of 20% is an approximation of how many persons either feel inconvenienced being required to ride the shuttle or may choose not to make the trip to Fallen Leaf Lake at all. Regardless of this, vehicle trips will either be reduced by shuttle use or not making the trip at all.

No traffic counts were taken during the survey period which correspond to the 9:00 AM to 4:00 PM gate operation period, although data was taken along Fallen Leaf Road near the Campground and south of Tahoe Mountain Road from 8:00 AM to 5:00 PM (see Table 6: Total 2-Way Traffic Counts, page 17). Averaged together, this volume multiplied by 0.80 (to convert to the 9 AM to 4 PM gate hours) will be used to establish two-way traffic volume. This equates to 638 vehicles. Of the two-way traffic during that time period, approximately 60% of the volume represented over that time period is headed southbound and based on the surveys of trip purposes, 50% of that traffic would be shifted toward shuttle use. Typically, the southbound traffic will become northbound traffic at the end of the day however under this alternative the net effect is by removing them from going southbound, the volume northbound has also been eliminated. In equation form, the net two-way volume reduction is calculated as follows:

638 two-way vehicles x 60% southbound (one-way) vehicles = 383 southbound vehicles

383 southbound vehicles x 50% trip "capture" rate = 192 southbound vehicles "captured"

Because the 192 southbound vehicles are captured via the gate checkpoint system on to shuttle use (or are dissuaded from making the trip), the same vehicles prevented from entering are also prevented from leaving. Therefore the two-way traffic volume of 383 vehicles per day is removed from the average Saturday vehicle trip count of 1,330 vehicles. This alternative indicates a reduction of 28.7% over the "No Action" Alternative.

Under the assumption that all vehicle trips are converted to transit (i.e., no people are dissuaded from visiting Fallen Leaf Lake), converting this traffic volume reduction to transit trips by multiplying by the vehicle occupancy rate (2.7 people/vehicle) indicates 516 people per day will head southbound via transit or 1,031 people per day including both directions. Using the peak hour factor of 9.4%, in one direction, the transit system would be required to shuttle up to 49 people/hour. Operation of two 25-28 passenger transit vehicles can meet that demand. Vehicles with that capacity are typically between 98" and 102" wide and about 25' long. While the road is narrow between Emigrant Road and the Marina, a vehicle this size will have extreme difficulties between the Marina and the Lily Lake parking lot. For that stretch, one 15-passenger van will be required which can navigate that section of roadway.

The amount of parking required in this alternative would need to be sufficient to handle the 192 vehicles not accessing the southern portions of Fallen Leaf Lake less persons in those vehicles that learned about the transit ridership requirement and would be coming to Fallen Leaf Lake via transit. Given an average visitation time of 4.6 hours and the 7-hour restriction, the size of the parking lot would in theory be sized to accommodate 66% of the 192 vehicles. The parking demanded according to the weekend parking survey indicated that from the Marina to Lily Lake,

up to 80 parking spaces were required. Given that some visitors will utilize transit from either South Shore or North Shore locations, provision for 80 spaces seems adequate. The opportunity to remove spaces is now available between the Marina and Lily Lake. Removal of all 39 informal parking along that section leaves adequate parking for those who park before 9 AM or after 4 PM. The distribution of this parking should be 8 spaces at the Tahoe Mountain Road parking area and 72 spaces at a parking area closer to Camp Richardson.

The infrastructure required for this alternative includes 6 benches (at the stops) and a transit shelter at the main parking location as well as the parking. In addition, two staff are required to run the gate.

From a policy perspective, implementation of this alternative is expected to increase the net travel time for visitors and decrease the travel time for residents. As compared to the "No Action" Alternative where residents and visitors share the same travel time, visitors under this alternative could be waiting up to 30 minutes or an average of 15 minutes to get a ride on the shuttle. This suggests that residents could be expected to assume some of the financial burden for operation of this system.

This alternative includes high capital and operational costs (see APPENDIX B). Taking into account the costs, including amortization of the capital costs over ten years, the cost/benefit ratio indicates that removing a vehicle from the roadway is $6.23.

The North Shore Trolley service (beginning in 1998) will provide a means of accessing Fallen Leaf Lake by transit from the North Shore via the Emerald Bay shuttle that connects to the shuttle service under this alternative near the Camp Richardson area.

Evaluation of the Parking Control with Shuttle Alternative

This proposal reduces vehicle trips through a mixture of parking fees, parking removal of 35 informal parking areas and enforcement of no informal parking from the Church to Lily Lake parking lot. This alternative also includes provision of a shuttle service which would be an option (or necessity when the parking is full) instead of parking for a fee. The most important aspect to the success of this alternative, however, communicating to the public the parking availability, parking fees, and the shuttle alternative.

With regards to parking removal, evaluation of the parking data indicates that those using the informal spaces arrive later in the day and are most likely day users that are sightseeing at Glen Alpine Falls or doing a moderate day hike. The turnover at the parking area is minimal. The parked vehicle survey indicates that the average length of stay at Lily Lake is 5.9 hours and that almost 80% of the parkers had been to the site previously. Removal of informal parking will shift some parking to the Lily Lake parking lot, filling it up faster, and thereby directing additional persons toward shuttle use. For the purposes of evaluation, the assumption is that those displaced by the 35 spaces will utilize the shuttle. At average vehicle occupancy of 2.7 passengers/vehicle, this equates to 95 persons that are likely to use the shuttle on a weekend due to parking removal. Removal of up to 70 vehicles (two-way direction – double the number of spaces removed) from the traffic stream will have some effect on congestion on Fallen Leaf Road.

The remainder of the shuttle use under this alternative will be akin to that proposed in the CTS Alternative. Regardless of the parking policies at Fallen Leaf Lake, the shuttle, as with the CTS Alternative, will provide a means for accessing Fallen Leaf Lake without having to drive or pay for parking once there. From the CTS Alternative, 34 fewer vehicles could be expected simply by providing a transit service to Fallen Leaf Lake. Combining the removal of parking with shuttle service provision, 71 vehicles could be expected or 142 less vehicles over the 1,330 24-hour traffic volume. The overall effect of this alternative needs to be combined with the parking fee data.

Imposition of parking fees for employees has been shown to be an effective trip reduction measure, however, for recreational purposes, parking fees represent a minor expense relative to entire travel budget. Data indicates that for recreational trips, the $5 parking fee for parking in the formal parking areas on its own would have little influence on travel behavior. Empirical data from the $3 charged parking at Eagle Falls indicates that that lot filled regardless of the fee. Another piece of empirical evidence is Yosemite National Park that raised its entrance fee to $20 in 1997 and had record visitation. These examples indicate that charging for parking may have little influence on reducing recreational vehicle trips. Therefore, minimal reduction in vehicle trips is proposed simply due to this factor.

The effect of combining parking fees in a recreational setting with a recreational shuttle has not been studied thus requiring assumptions for this alternative. One method of determining how many people might choose to utilize transit versus paying a parking fee is to examine the vehicle occupancy of those parking in those areas today. The assumption is that those with four or more people would pay the $5 parking fee while vehicles with 3 or less (allowing for 20% of those who would still opt for payment) would opt for the shuttle since their party would cost less via the shuttle. Based on the inbound and outbound intercept surveys, the vehicles with three or less people in them averaged 70% of those interviewed. Assuming the Lily Lake parking area fills to its 42-space capacity, after applying the above percentages, 24 vehicles with three or less people in them would opt for the shuttle service or 57% of the Lily Lake parkers. Combining this method with the parking reductions and shuttle service provisions from above, a total of 95 vehicles a day are eliminated from the one-way volumes. Doubling that value (the majority of these trips are day trips) 190 vehicles per day could be removed from the two-way daily traffic volumes. This represents a 14.6% decrease in traffic volumes due to implementation of this alternative.

Implementation of this alternative requires shuttle transport of 257 person trips or daily shuttle ridership of 514 persons. During the peak hour, approximately 24 person trips would be required. Operations of this shuttle system with two 15-passenger vans will accommodate this level of ridership but allow little room for growth in the system. Unlike the CTS Alternative, even with anticipated traffic growth, the provision of the shuttle and the parking fees are expected to significantly slow the return to the traffic conditions currently experienced. Following the trend in increasing shuttle ridership versus traffic volumes through the Tahoe Basin, demand for the shuttle is expected to increase faster than “replacement” traffic. The first several years of such a shuttle system may be sufficient but expectations are that ridership will increase such that a third van would be required (for this analysis and cost projections, two vans will be assumed).

Construction of parking facilities in the vicinity of Camp Richardson or other nearby location would require about half the total parking infrastructure as proposed under the “Devil’s Postpile” Alternative. The signage and other services for the shuttle will operate similarly but with two vans instead of two larger vehicles and a van.

The cost of this alternative is lower than the “Devils Postpile” Alternative but does not have as high a cost/benefit ratio because it is not as effective at removing traffic volume from the roadway. Travel times for visitors are expected to increase for those who are “forced” to utilize transit for their trip to Fallen Leaf Lake.

Implementation of this alternative is expected to take a lengthy period of adjustment as the high proportion of repeat visitors to Fallen Leaf Lake will have to be accustomed to the parking fee system, the reduction in parking, and the shuttle service. This alternative is a modified control alternative as compared to the “No Action” Alternative (no control) and the “Devils Postpile” Alternative (control). From a policy standpoint, mode choice is left open to the visitor with pricing and parking limitations attempting to direct mode shift toward transit.

The North Shore Trolley service (beginning in 1998) will provide a means of accessing Fallen Leaf Lake by transit from the North Shore via the Emerald Bay shuttle that connects to the shuttle service under this alternative near the Camp Richardson area.

Evaluation of the Parking/Viewing Area Construction at North End of Fallen Leak Lake Alternative

Construction of a parking lot and viewing area at the north end of Fallen Leaf Lake is designed to divert those sightseers who would be satisfied with viewing the Lake from the north end as opposed to the current situation where the first readily accessible lake view is available only from the south end. On both the inbound and outbound surveys, surveyed drivers were asked, hypothetically if they would utilize such a situation. The question was also asked if the viewing area from the parking area required a five-minute walk. Answers to that question were poorly understood by respondents and did not generally make a difference in developing and assessing this alternative.

Of the trip purposes, the only applicable trip captured under this alternative would be the sightseer to Fallen Leaf Lake (hikers and backpackers are assumed to have a trailhead destination at the south end of Fallen Leaf Lake). On the inbound survey this represented 18% of the total respondents. Of those, 46% (half the “Maybe” responses were included) indicated that they would not make the trip to the south end of the lake. Applying these percentages to the 24-hour peak day ground counts (this averaged 1,366 at Tahoe Mountain Road), equals 57 vehicles that are likely to not make the round trip travel to the south end on a peak day. This is approximately 8.3% of the 24-hour traffic volume on Fallen Leaf Road. The two-way volume would be double that value or 113 vehicles. This assessment presumes that those utilizing the parking area don’t also go to the south end of Fallen Leaf Lake to sightsee there as well.

In general, sightseeing trips are of shorter duration that day hiking trips so the parking need is minimal given expected turnover times. Utilizing the peak hour factor over three hours (an average duration for sightseers that may take short hikes) for the 57 vehicles, it is anticipated that 16 parking spaces would be sufficient to accommodate sightseers at this location.

The use of the survey data is only an estimation of the potential use of the parking/viewing facility. Under the assumption that traffic growth will continue, it can be expected that volumes will increase over time both at the parking/viewing facility and along Fallen Leaf Road as this alternative provides no controls over traffic volumes on Fallen Leaf Road.

This alternative does not address the parking situation at the terminus of Fallen Leaf Road where Lily Lake, Glen Alpine Falls, and access to hiking trails attracts a steady base of sightseers, hikers, and backpackers. This alternative is expected to draw away some parking pressure to the south end of Fallen Leaf Lake and perhaps free some parking that would have otherwise been used by the Fallen Leaf sightseers. Although parking turnover studies were not conducted to ascertain how long individual vehicles were parked on average in specific locations, it is surmised that sightseers would have primarily utilized the Marina parking areas and not stayed as long as those choosing to hike. If this were the case, approximately 57 vehicles/day would not be competing for parking near the Marina location.

Cost of this alternative (see APPENDIX B) is low and the cost/benefit ratio favorable. The alternative does not involve access control through the narrowest and most congested portion of Fallen Leaf Road and is not expected over time to represent an improvement over the “No Action” Alternative. In addition, construction of the parking facility would take place in a sensitive and culturally significant environment.

Evaluation of the Parking Prohibition with Shuttle

This alternative effectively has the impact of removing all sightseeing, hiking, and backpacking trips from travelling down Fallen Leaf Road. The effect on traffic volumes was discussed previously and represents the maximum trip capture scenario among the alternatives. The net effect of this alternative on 24-hour daily traffic volumes is a 46.6% reduction (621 two-way trips out of 1,330). As described, the only traffic utilizing the roadway past Tahoe Mountain Road would be residents and guests of resident's as well as Stanford Camp guests and Marina users.

Converting the two-way reduction to the number of peak hour transit riders is done according to the following formula:

621 two-way trips x 0.5 (to obtain one-way trips) x 2.7 vehicle occupancy x 9.4% peak hour factor = 79 persons/hour

This alternative, if implemented, would require purchase and operation of at least three 25-28 transit vehicles. With the restrictions concerning parking, it is likely that as with the "Devils Postpile" Alternative, that some visitors would be dissuaded from making the trip to Fallen Leaf Lake. Operation of three 98" to 102" wide vehicles with a length of approximately 25' is possible for the entire roadway to Lily Lake if between the Marina and Lily Lake parking lot there were no competing vehicle traffic. With the parking prohibition for this area, the drivers in such vehicles would only be required to communicate with each other to arrange appropriate passing opportunities. Indications are that no passing would be required in the narrow Marina to Lily Lake roadway. For the purposes of the analysis, the assumption is that rubber-tire trolleys would be utilized.

Since all public parking is prohibited under this alternative from the Marina to Lily Lake parking area, construction of a parking area would be required at or near the north end of Fallen Leaf Road. Indications are that up to 311 vehicles throughout a typical Saturday would be shifted from traveling Fallen Leaf Road due to the prohibition in to shuttles. A 150 space parking area is expected to be sufficient to accommodate the shift. This amount of parking takes into account the parking turnover rate and recognizes that some people will arrive at the area via transit from other origins or will be dissuaded from making the trip altogether.

Signage indicating the parking prohibition will be required as well as enforcement. Visitors shifted towards transit use will require shelters at both the parking area and Lily Lake as well as benches at stops along the way.

Even with high cost, this alternative, due to its control strategy, has a favorable cost/benefit ratio. The travel time is expected to significantly increase for visitors over the "No Action" Alternative. Waiting for the trolley shuttle is expected to take on average 15 minutes. This increases the average travel time for visitors from 25 minutes to 40 minutes. Fallen Leaf residents receive a clear benefit due to this alternative and could be expected to support a portion of the shuttle operations.

Evaluation of the North End Parking and Water Taxi Service Alternative

This alternative is very similar to the previous parking/viewing plan but an attraction of a water taxi ride has been added to provide an alternative access mode to the southern end of Fallen Leaf Lake. Provision of the water taxi allows a north end parking facility to capture greater numbers of trip purposes that include day hikers, backpackers, and sightseers to Glen Alpine Falls.

From the outbound survey, approximately 42% of the drivers could be considered possible candidates for the use of the parking/water taxi option. Of those in the survey who responded that they were sightseers or using a trail, about 61.5% indicated they would still have made their trip if

the only way to access Fallen Leaf Lake was to leave their car at Camp Richardson, take a free shuttle to the north end of Fallen Leaf Lake, and then take a commercial boat service to the southern end. With the exception for the Camp Richardson parking and shuttle description the nature of the response is similar. Using this data, it indicates that the daily two-way traffic volume would be reduced by approximately 350 vehicles. This reduces daily two-way traffic volumes 26%. This estimation ignores the effect of price.

The proposed $2 per person round trip water taxi ride would be a deterrent to families whose round trip cost is significant enough that they choose to remain in their own vehicle to get to the south end of the lake. It is expected that the $2 fee would eliminate some vehicles with three or more persons. From the inbound and outbound surveys, an average of 55% of the vehicles has two or less persons in them. Of those, an assumption that 70% of those with greater than two persons would be willing to pay the $2/person fee (the boat ride is an attraction itself) when the free alternative of parking a vehicle at the south end of the lake exists. For vehicles with two or less, the assumption is that 80% of them would choose the water taxi ride. Accounting for the effects of price under these assumptions, drivers of 122 vehicles/day would choose to utilize the water taxi service. By doubling the number of vehicles/day (244 two-way volume) to obtain the two-way volume and then comparing that to the Saturday average of 1,330, it represents a reduction in the two-way traffic volumes of 18.3%.

Whether the price of a taxi ride is $2 or some other amount, it is evident that pricing is an influential factor in the effectiveness of this alternative at solving the problems identified at Fallen Leaf Lake.

The water taxi service will require hourly maximum passenger capacity of 31 people/hour based on the number of one-way vehicle trips, 2.7 vehicle occupancy, and the 9.4% peak hour factor. With this hourly capacity need, a more effective service would be a faster boat that can transport patrons across the lake in 15-minute intervals. If this can be accomplished, the vessel would need to accommodate at least 16 people but a more favorable design would be one for 20 passenger capacity.

The parking area required under this alternative would be approximately 80 vehicles, slightly more than the turn around time suggests due to the time for the boat ride. Other infrastructure required for this alternative is a van that picks visitors at the Marina to transport sightseers, hikers, and backpackers to the trailheads. This van would also be required during periods when the waters of Fallen Leaf Lake are too choppy to operate the water taxi service; visitors would require transport back to their parked vehicles. A docking facility would be required at the north side of Fallen Leaf Lake as well.

The water taxi may become its own attraction, drawing more persons to visitor areas of Fallen Leaf Lake than limited under the “No Action” Alternative by the capacities of the roadway. Since this alternative does not involve a control strategy, more overall people may access Fallen Leaf Lake. The alternative has the highest capital cost of all the alternatives and does not include a low cost/benefit ratio.

From a policy perspective, this alternative does not limit access to any particular user group. Environmentally this alternative has the greatest impact of all alternatives. The very nature of the service may degrade the rustic, nestled setting of Fallen Leaf Lake for those who reside and visit Fallen Leaf Lake year after year.

Evaluation of the “Rules of the Road” with Pullouts Alternative

This alternative is developed to address the congestion caused by exceptionally large vehicles and provide direction to drivers as to who is to pull to the side when vehicle conflicts occur. While

congestion occurs at points along Fallen Leaf Road simply due to automobile and light truck activity, extreme congestion occurs when a large vehicle enters that mix of traffic. Signage describing the roadway will be effective to those drivers who heed the warning. Establishing pullover requirements is expected to be an effective traffic flow measure if volumes are not going to be reduced.

Driving travel times on a weekend and weekday were consistent. The largest variation in travel times occurred on the weekend. The most extreme delay was on the section of road between the Marina and Emigrant Road. While that section averaged seven minutes, one sample showed eleven minutes. This additional four minutes is not indicative of the ten to twenty minute waits that some residents have noted when extremely large vehicles and high volumes of traffic are involved. No data has been collected demonstrating how often ten minute or greater delay situations occur.

Without knowing the vehicle mix characteristics, a quantitative assessment of this alternative is futile. Enactment of the policies and the signage in this alternative are expected to have some benefit for those traveling Fallen Leaf Road. The possibility of implementing this alternative in combination with the CTS Alternative or the Parking Management Alternative is an option that may enhance the function of the road in addition to the effectiveness of those alternatives.

This alternative has low cost and the potential to “solve” the traffic conflict issues in many situations. This alternative when discussed with residents was seen as very popular on its own and could be combined with any of the other “no control” alternatives in this study.

Emerald Bay

The alternatives chosen for Emerald Bay are centered on transit. Even the “No Action” Alternative includes the existing Emerald Bay Shuttle. Emerald Bay alternatives are essentially broken into transit operations at three levels: low, medium, and high. The alternatives are evaluated below.

Evaluation of the “No Action” Alternative

The “No Action” Alternative does not include improvements to parking or transit shuttle systems. The impacts already described are expected to worsen as traffic levels within the Region, as well as Emerald Bay, increase over time. If the potential remains, “creation” of more informal parking is anticipated by motorists attempting to park in proximity to Emerald Bay’s various attractions.

Ridership levels of the Emerald Bay Shuttle are expected to increase as well. Surveys of shuttle riders (taken in 1997, the first year of operations) indicate that 86% of the passengers thought the service was in the good or very good range. In 1997, the shuttle operated for 87 days and handled 5,725 passengers. Operations ran from 10:15 AM to 7:00 PM. The shuttle vehicle used was a “Zoo Bus”; an open-air tour shuttle bus.

Comparable parking effects (which were minimal) are anticipated for the Eagle Falls Demonstration Fee Program. Also begun in 1997, this program collected $40,000 in parking fees. Data indicates that fees at Eagle Falls did not deter parking as the lot filled up to capacity on both weekend and weekdays.

Severe parking shortages due to the high visitor demand in this area are expected to continue even though ridership of the Emerald Bay Shuttle is expected to increase. Recreational sites, Vikingsholm, Eagle Falls, will continue to receive more visitation than facilities are able to withstand. From the Emerald Bay Tram On-Board survey, 41% of the riders reported that they were riding the shuttle service round-trip as a means of seeing Emerald Bay. Whether the shuttle service replaces the trip in a vehicle driving through Emerald Bay or saves a brief stop with parking at Emerald Bay is unclear.

Evaluation of the Increase Emerald Bay Shuttle Service Alternative

This alternative provides shuttle service to Emerald Bay on a more frequent basis than in the "No Action" Alternative or present day level of service. The existing shuttle service provides service on hour headways. Based on travel times, the weekday and weekend travel times between Camp Richardson and Vikingsholm parking lot averaged about 14 minutes. Some time must be allocated to boarding and alighting the shuttle. When that is factored in, service could be increased to half-hour headways with plenty of time at each stop on the route to allow for late arrivals.

In 1997 the shuttle system carried an average of 7.3 people/hour. Averaging this ignores some of the observed fluctuations in demand that are highest on the weekend and drop significantly on the weekday. In 1998, although the shuttle is operating for fewer than 87 days, the ridership per hour is expected to increase.

Adding another shuttle that increases service can be expected to draw more ridership to the route. Quantification of this alternative presents problems in that there is no data that suggests people's willingness to utilize transit in the Emerald Bay area versus their own vehicle. The parked vehicle survey conducted indicates that stays in the Emerald Bay area, whether for using the trails or visiting Vikingsholm were between 3.5 and 4.6 hours. Most visitors (about 70%) had visited the area before. Time spent at particular destinations and the high repeat visitation are strong indicators that the potential for increasing Emerald Bay shuttle use is high.

This alternative, if successful, is expected to temporarily relieve some of the pressure on parking in the area. The primary boarding area at Camp Richardson and its connections to the other transit trolley services orients the Emerald Bay Shuttle use toward those already using transit. Data from the Emerald Bay Tram On-Board Survey indicates that 43.2% of the riders got to the shuttle via the South Shore trolley while 21.6% indicated they drove (the remainder of the surveyed indicated that they walked or had some other means for getting to the Emerald Bay shuttle). This indicates that the shuttle from Camp Richardson on is at least eliminating 21.6% of the shuttle riders or about 5 vehicles/day from the Emerald Bay area. When factored with those already riding the trolley that got on the Emerald Bay Shuttle, this is another 11 vehicles/day. It can be assumed that at least 15 vehicles/day are removed from the traffic stream. Working backwards from the 1997 ridership of 5,725 people, approximately 12.3 vehicles per day were eliminated from having to park at Emerald Bay. This supports the estimates of 15 vehicles/day. Parking turnover at Emerald Bay based on the average length of stay at a parking area is minimal. Removal of 15 vehicles from the demanded parking indicates that parking would have been even worse had those vehicles been added to those already exceeding the parking supply. At average vehicle occupancy of 2.7, this adds demand for 41 two-way person trips to the Emerald Bay Shuttle service for a peak weekend day. In addition, data indicates that the demand for parking is so high at Emerald Bay that vehicles "removed" by the shuttle will be replaced by vehicles who now have an open parking space. The expectation is that demand for both modes of travel is high enough that shuttle ridership will grow and the levels of private vehicle use will grow in the Emerald Bay area.

As indicated from the Emerald Bay Tram On-Board Survey, 41% of the tram riders were riding the service round-trip. Increasing the shuttle service under this alternative may allow for more persons who would otherwise be driving through or stopping briefly to utilize the shuttle for their intended trip purpose. This will free some parking spaces in locations where short duration parking takes place making those spaces available more often for longer term parkers.

The shuttle service proposed in this alternative along with no parking restrictions increases the overall capacity to place people at Emerald Bay recreation sites. Indications from California State Parks are that under the "No Action" Alternative, visitation is already beyond the capacity of Vikingsholm. Addition of an additional shuttle provides the possibility to further impact Emerald

Bay locations that are over people capacity. Implementation of this alternative would require coordination with the US Forest Service and California State Parks to insure that additional shuttle service doesn't adversely affect the resources they manage.

For the purposes of calculating the revenues from expanding service while still keeping the $2/person charge, the assumption is that the ridership will double with the additional vehicle. This represents an elimination of 30 vehicles/day. At occupancy of 2.7, 81 one-way person trips will be required of the shuttle.

Evaluation of the Parking Management and Increased Shuttle Service Alternative

This alternative builds upon the previous alternative's increased shuttle service but adds a component that manages parking with the intent of driving more shuttle ridership. Most notably this alternative eliminates all informal parking spaces, charges for formal parking, and includes an enforcement component to parking management.

Elimination of the informal parking spaces from the Emerald Bay Campground to Vikingsholm amounts to 169 spaces, leaving 143 formal parking locations in the same stretch. Information was not collected to assess whether or not elimination of informal parking and charging for formal parking would impact the desire to travel to Emerald Bay. The means to access the attractions at Emerald Bay after implementation of this alternative will be either via shuttle or by private vehicle, provided an open formal paid parking space is available. Given these options, some individuals would be expected to forego a visit to Emerald Bay although without collected data, determining a percentage is speculation.

For the purposes of assessing potential ridership changes to the Emerald Bay shuttle system, the assumption is that demand to visit Emerald Bay stays as it is, parking in formal spaces always reaches capacity regardless of the parking fees, and that all shifts from private vehicles are to the Emerald Bay shuttle. No precise data assessing how often the 169 informal parking spaces (to be removed under this alternative) are utilized throughout a typical weekend day has been established. From the parking surveys indications are that parked vehicles will occupy their space on average about four hours. The parking accumulation survey in combination with the four-hour parking average suggests that half of these spaces turn over during a weekend day. This equates to 254 vehicles. At an average occupancy of 2.7, this equates to 684 two-way person trips required of either shuttle service from Camp Richardson or from North Shore Trolley service. From the parker survey for the two Emerald Bay locations, the split between South Shore and North Shore access was 60:40. Accommodation of 410 two-way person trips for the Emerald Bay Shuttle service and 274 two-way person trips for the North Shore Trolley over and above existing weekend day demand would be required as a result of this alternative.

Both of the shuttle services for this alternative must respond to the peak hour ridership numbers. Converting to a one-way person trip for both service directions using the 14.4% peak hour factor indicates that the South Shore shuttle requires capacity of 30 people/hour and the North Shore shuttle capacity of 20 people/hour. At this rate, running two shuttles from South Shore and one from North Shore on an hourly basis would be sufficient to handle the demand, although from a service standpoint, a second North Shore shuttle is advisable.

Approximately 41% of the visitors riding the present day Emerald Bay Shuttle indicated that the shuttle was their means of seeing Emerald Bay, without getting off the shuttle to reboard later. Under this alternative, the shuttle combined with the parking restrictions and parking fees will provide an optimal mode of travel for those who simply want to see Emerald Bay without getting off the shuttle.

Infrastructure required of this alternative includes “No Parking” signs, payment drop boxes, enforcement and some place to park a vehicle before boarding the shuttle systems. Between South and North Shores, parking should be provided that accommodates the 169 spaces removed on the approximate 60:40 South to North Shore ratio. The opportunity to reduce the amount of “replacement” spaces should be considered because visitors may find it more convenient to get to the Emerald Bay transit services from other transit services that connect to their lodging site.

Unlike the Increase Emerald Bay Shuttle Alternative, this alternative allows the US Forest Service and California State Parks to work with the transit provider to maintain a desired visitor capacity. The assumption of this alternative is that current levels of visitation will be maintained.

Some increased travel time is expected for overall visitor use under this alternative although the determination of net additional travel time is difficult to obtain. On average, the expected waiting time for transit would be 15 minutes additional time. However, the parking data suggests that because parking capacity is exceeded today, there are some vehicles that can not access Emerald Bay attractions or some that can but must wait for a parking space. No data was collected to assess the travel times spent looking for parking or what “displaced” visitors did if no parking was found.

Comparison of the Alternatives for Fallen Leaf Lake and Emerald Bay

As previously discussed, assessment of the alternatives for Fallen Leaf Lake and Emerald Bay is difficult to achieve utilizing the standard criteria of a typical transportation study. For that reason, the alternatives are evaluated with respect to their performance on the criteria. The alternatives are compared in a matrix format in , page 63. The criteria for evaluating the alternatives are described previously in the study. Performance of each alternative is evaluated according to the quantitative or qualitative data available.

The cost summary for each alternative is included in Table 23, page 64. Costs breakdowns for each alternative are provided in APPENDIX B. Costs vary significantly according to the alternative. The cost/benefit ratio for each alternative is only one of the criteria included in the study.

Table 22: Comparative Assessment of the Alternatives

	Where quantitative data is not available, qualitative values are assigned							
	Vehicle Conflicts	**2-Way Volume Reduction**	**Parking Demand/Supply**	**Cost/Benefit ($/Vehicle) ***	**Decrease Auto Dependency**	**Threshold Benefit**	**Implementation Complexity**	Visitor Travel Time
Fallen Leaf Lake								
"No Action"	0	N/A	0	N/A	0	0	Low	0
Coordinated Transit System Extension	0	67	0	**$12.48**	+	+	Low	0
"Devils Postpile" Shuttle System	+	383	+	**$6.23**	+	0	High	-
Parking Control with Shuttle	+	190	+	**$7.00**	+	+	High	-
Parking/Viewing Area Construction	0	113	+	**$1.01**	0	-	Medium	0
Parking Prohibition with Shuttle	+	621	+	**$4.04**	+	+	Medium	-
North End Parking and Water Taxi Service	+	244	+	**$8.64**	0	—	High	0
Signage and Vehicle Size Restrictions	+	N/A	0	**N/A**	0	0	Low	0
Emerald Bay								
"No Action"	N/A	N/A	0	N/A	0	0	Low	0
Increase Shuttle Service	N/A	30	0	**$30.20**	+	+	Low	0
Parking Mgmt. and Shuttle Service Increase	N/A	254	+	**$3.56**	+	+	High	-
* Costs include operational costs and 10 year amortization of capital costs less any revenues generated								

+ = Major Positive Impact

+ = Minor Positive Impact

0 = No Impact

- = Minor Negative Impact

— = Major Negative Impact

Table 23: Alternative Cost Summary

FALLEN LEAF LAKE ALTERNATIVES	Capital Cost	Operational Cost	Revenue Generation	Two-Way Volume Reduction	Days of Operation	Operational Cost Ratio ($/Vehicle)	Capital (10 Yr. Amortization) and Operational Cost Ratio ($/Vehicle)
Coordinated Transit System	$131,088.00	$58,803.21	$7,654.00	67	86	**$10.21**	**$12.48**
Devils Postpile Shuttle	$578,389.00	$147,339.18	$11,997.00	383	86	**$4.47**	**$6.23**
Parking Control w/Shuttle	$329,760.63	$81,340.21	$17,157.00	190	86	**$4.98**	**$7.00**
Parking Area at North End	$65,695.00	$3,220.00	$0.00	113	86	**$0.33**	**$1.01**
Parking Prohibition w/ Shuttle	$810,197.15	$134,833.45	$0.00	621	86	**$2.52**	**$4.04**
North End Parking & Water Taxi	$1,318,933.20	$49,428.24	$56,588.00	244	86	**$2.36**	**$8.64**
"Rules of the Road"	$6,960.00	$3,440.00	$0.00	-		-	**-**
EMERALD BAY ALTERNATIVES							
Increase Emerald Bay Shuttle	$275,400.00	$50,382.30	$13,932.00	30	86	**$19.53**	**$30.20**
Parking Management w/ Shuttle	$685,548.60	$9,119.30	$92,235.00	254	86	**$0.42**	**$3.56**

Summary Discussion of the Alternatives

During the analysis period, alternatives were discussed with various stakeholders in the Fallen Leaf Lake and Emerald Bay areas. During discussions, the recognition that the time for implementation for any of the alternatives, except the "Rules of the Road" Alternative, would be best coordinated with the transportation planning efforts begun for the SR 89 corridor by the Lake Tahoe Transportation and Water Quality Coalition.

The planning efforts underway for the SR 89 corridor as well as discussion with representatives of Fallen Leaf Lake residents have provided some indications of what alternatives would be preferred for both areas.

Fallen Leaf Lake

The alternatives for Fallen Leaf Lake can be organized into three categories. The first is a "no control" category and includes the "No Action" Alternative, the CTS Alternative, the Parking Area at North End Alternative, the North End Parking and Water Taxi Alternative, and the "Rules of the Road" Alternative. These alternatives do not involve any restrictions regarding vehicle access and provide options whereby trips to the southern end of Fallen Leaf Lake may be reduced or done with less conflict. On the other end of the spectrum are the two "control" alternatives; Devils Postpile Alternative and the Parking Prohibition Alternative. Both of these involve some form of mandatory mode shift through regulations. The "partial control" alternative is the Parking Control with Shuttle Alternative. This alternative includes incentives and disincentives to encourage mode shift towards shuttle use.

When discussed with various representatives of Fallen Leaf Lake, the preferred alternatives were the "No Action" Alternative, the CTS Alternative, and the Parking Control with Shuttle Alternative. The representatives felt the latter two alternatives could be considered if the shuttle systems were managed so as to not increase the people capacity in the area. The more intensive and expensive "control" alternatives were not favored due to their complexity and presumed share of cost bearing by residents of Fallen Leaf Lake.

Regardless of the three "favored" alternatives, the "Rules of the Road" Alternative was looked at as of immediate benefit. Implementation also does not preclude the pursuit of other alternatives in the future.

The remaining "no-control" alternatives were not favored due to their high cost and uncertain long-term effectiveness.

Indications from the Coalition's initial focus of SR 89 corridor issues that the most favored alternative would be the Parking Control and Shuttle Alternative. The alternative includes a strong transit component consistent with a transit focus for Lake Tahoe and includes parking management to encourage the mode shift towards transit. As discussed above, implementation of this alternative should be done in accordance with transit operation and parking management plans for the SR 89 corridor.

Emerald Bay

The preferred alternative for the Emerald Bay is the Parking Management with Shuttle Alternative. The other Emerald Bay alternatives do not address the parking supply and demand issues effectively. There is a strong interest in the Coalition to address parking management in the Emerald Bay area as it is perhaps the most popular destination along the SR 89 corridor. If pursued, implementation of this alternative should be coordinated with the transit and parking management objectives under discussion by the Coalition. California State Parks is in the process

of adding the trail infrastructure that will support this alternative. In addition, Parks's staff has indicated that elimination of the shoulder parking is an objective. They also indicated that locations for transit pullouts are available and are designed into their planned trail upgrades.

APPENDIX A

Table 24: Fallen Leaf Lake Roadway Pullouts

Page 1 of 7

	Paved Roadway	Pullout Location		Potential Bus Use Pullouts	
Road Distance (feet)	Width (Feet)	Width (feet)	Length (feet)	Along Roadway	Driveway
Beginning at Highway 89					
100	17	27	53	X	
200	20	8	40		
		13	100		
400	17	36	258	X	
		10	83		
550	17	22	100	X	
750	16				
950	15	16	75	X	
		7	36		
1,200	17	9	50		
1,350	15	16	40	X	
1,500	17	7	39		
1,600	16	5	24		
1,700	17	10	55		
1,800	18	11	102		
1,950	19				
2,100	15	13	55		
2,300	15				
2,450	16	7	54		
2,650	16				
2,850	17				
3,050	18	25	47	X	
3,250	15	20	30	X	
		29	47	X	
3,450	17	11	42		
		7	35		
3,700	15	9	36		
3,800	17	11	30		
4,000	15				
4,150	17	28	89	X	
		62	52	X	
4,300	13	10	41		
4,400	14	11	55		
4,500	13				
4,600	14				
4,700	15	25	16	X	
4,850	14				
5,000	16	18	62	X	
5,100	13				
5,200	15				
5,300	15				
5,450	16	6	39		

Table 24 (continued): Fallen Leaf Lake Roadway Pullouts
Page 2 of 7

Road Distance (feet)	Paved Roadway Width (Feet)	Pullout Location Width (feet)	Length (feet)	Potential Bus Use Pullouts Along Roadway	Driveway
5,600	15	23	26	X	
5,700	14	7	57		
5,800	16				
5,950	16				
6,100	14				
6,250	15				
6,350	16				
6,600	12	10	72		
6,750	12				
6,900	15				
7,000	12				
7,150	12				
7,300	12				
7,450	13				
7,550	13	6	49		
7,650	12				
7,750	14	19	47	X	
7,800	14	14	42	X	
7,950	12				
8,100	12	8	63		
8,250	12				
8,325	13	6	30		
8,425	13	5	44		
8,525	10	7	36		
8,625	11	10	32		
8,675	13	13	29		
8,775	12	8	68		
8,875	11				
8,975	14	5	50		
9,075	12				
9,175	14	12	75		
9,375	14	8	66		
9,525	15	7	56		
9,675	13				
9,825	13	14	35	X	
9,925	13	7	25		
10,025	14				
10,125	13				
10,275	18				
10,375	12				
10,475	16	7	28		
10,575	11	8	37		
		10	38		
10,775	12	13	29		
10,875	15				

Table 24 (continued): Fallen Leaf Lake Roadway Pullouts
Page 3 of 7

	Paved Roadway	Pullout Location		Potential Bus Use Pullouts	
Road Distance (feet)	Width (Feet)	Width (feet)	Length (feet)	Along Roadway	Driveway
10,975	16				
11,075	17				
11,175	16				
11,275	16				
11,425	17				
11,525	16	12	54		
11,625	16				
11,775	16	17	39	X	
11,875	14				
11,975	17				
12,125	17				
12,225	13				
12,375	16	10	49		
		6	34		
12,475	14				
12,575	16				
12,675	13				
12,775	16				
12,875	14	4	39		
12,975	12				
13,075	14				
13,225	14	15	54	X	
13,325	15				
13,425	17				
13,525	14				
13,625	12	5	22		
13,725	16				
13,825	16				
13,925	15				
14,025	16				
14,125	14				
14,225	18				
14,325	17				
14,425	20				
14,525	15				
14,625	14				
14,725	18				
14,825	17	8	35		
14,925	22	15	17	X	
15,025	14				
15,125	15				
15,275	18	DW 8.2	37		
15,425	16	DW 7.5	44		
15,525	13	12	31		
		DW 9.0	37		

Table 24 (continued): Fallen Leaf Lake Roadway Pullouts
Page 4 of 7

	Paved Roadway	Pullout Location		Potential Bus Use Pullouts	
Road Distance (feet)	Width (Feet)	Width (feet)	Length (feet)	Along Roadway	Driveway
15,625	10				
15,725	16	DW 14.9	58		X
15,825	10				
15,925	11	6	49		
16,025	12	DW 17.7	38		X
16,125	11				
16,225	9				
16,325	11				
16,425	12	DW 18.4	22		X
		6	93		
16,525	11	DW 10.6	31		
		5	49		
16,625	12				
16,725	11				
16,875	12	DW 7.5	19		
		7	35		
		13	40		
17,025	10	5	47		
		DW 12.8	23		
17,175	11	10	78		
17,275	10	DW 18.8	24		X
17,375	12	7	31		
		DW 13.8	41		
17,525	11	9	29		
		9	24		
		7	44		
17,625	10	5	75		
17,775	12	7	53		
		DW 20.4	20		X
17,875	11				
17,975	12	DW 18.5	21		X
		DW 8.1	22		
18,125	12	DW 18.4	18		X
18,225	12	DW 10.11	24		
18,325	12	DW 15.10	28		X
18,475	11				
18,575	12	7	33		
		10	29		
18,675	11	7	39		
		DW 16.2	30		X
18,775	12	DW 18.10	20		X
18,925	11	DW 22.0	43		X
19,025	14	DW 24.3	32		X
19,125	12	DW 61.2	19		X
19,225	13	38	27	X	

Table 24 (continued): Fallen Leaf Lake Roadway Pullouts
Page 5 of 7

	Paved Roadway	Pullout Location		Potential Bus Use Pullouts	
Road Distance (feet)	Width (Feet)	Width (feet)	Length (feet)	Along Roadway	Driveway
19,325	9	DW 12.2	25		
19,425	11	DW 13.2	37		
19,575	12	DW 29.2	21		X
19,775	11	DW 27.10	22		X
19,875	11				
19,975	9	DW 19.3	28		X
		DW 10.5	28		
20,075	12	DW 20.9	20		X
		13	49		
20,225	13	DW 15.4	15		X
20,325	9	DW 44.8+	17		X
20,425	11	10	28		
20,525	11	DW 15.2	20		X
20,725	13	DW 15.3	23		X
		7	32		
20,825	12	8	24		
20,925	10	DW 10.0	24		
21,025	11	DW 13.2	18		
		9	60		
21,125	11	5	24		
		DW 27.7	27		X
		DW 5.4	39		
21,275	11				
21,375	12	DW 7.2	18		
21,525	12	DW 6.8	20		
21,625	12	8	28		
21,725	11	10	48		
		DW 19.1	17		X
		DW 11.2	56		
21,825	10				
21,925	12	DW 8.11	42		
22,025	10	DW 6.8	19		
22,125	9	17	28	X	
		DW 13.4	25		
22,225	11	DW 22.4	24		X
		7	28		
22,325	11	14	35	X	
		38.9+	33	X	
22,425	8	DW 25.10	30		X
22,525	12	10	30		
22,625	12	8	46		
22,725	11	DW 14.7	19		X
22,825	13				
22,975	10				
23,075	12	DW 52.9	18		X

Table 24 (continued): Fallen Leaf Lake Roadway Pullouts
Page 6 of 7

	Paved Roadway	Pullout Location		Potential Bus Use Pullouts	
Road Distance (feet)	Width (Feet)	Width (feet)	Length (feet)	Along Roadway	Driveway
		5	22		
23,175	15	DW 18.1+	42		X
23,275	17				
23,375	16				
23,475	18				
23,575	16				
23,675	16				
23,775	15				
23,875	17				
23,975	16				
24,075	16				
24,175	17				
24,275	15				
24,375	17				
24,475	17				
24,575	14				
24,675	16				
24,775	17				
24,875	16				
24,975	16	8	26		
25,075	16				
25,175	14				
25,275	11	13	25		
		11	31		
25,345	10				
25,445	9				
25,545	11	10	37		
25,645	10				
25,795	9	13	34		
		9	31		
		15	30	X	
25,995	14	12	45		
26,195	13	10	23		
		39	63	X	
26,295	11	13	94		
		12	27		
26,395	7	9	27		
26,445	9	5	42		
26,645	11	17	38	X	
		14	41	X	
26,745	12	23	61	X	
26,845	9	16	21	X	
26,995	8	6	22		
27,095	9				
27,195	7				

Table 24 (continued): Fallen Leaf Lake Roadway Pullouts
Page 7 of 7

	Paved Roadway	Pullout Location		Potential Bus Use Pullouts	
Road Distance (feet)	Width (Feet)	Width (feet)	Length (feet)	Along Roadway	Driveway
27,295	8				
27,395	8				
27,495	9	9	21		
27,595	11				
27,745	10	7	24		
27,845	10				
27,995	11	10	50		
28,045	9	10	23		
28,145	12				
28,345	12	6	55		
28,445	11	8	67		
28,545	13				
28,610	16				
STC					
28,710	17				
28,810	18				
28,860	10	5	21		
28,940	10				
29,040	10				
29,140	10				
29,240	10				
29,340	10				
29,490	10	7	35		
29,640	12	7	31		
		5	12		
29,790	10	6	52		
29,890	10	9	43		
29,990	10				
30,090	10				
30,140	9	15	48	X	
30,240	10				
30,340	11				
30,490	29				
30,560	9				
30,690	10				
30,790	8				
30,910	7				
31,060	12				
31,260	10				
31,540					
Ending at Trailhead					
				40	**33**

APPENDIX B

Cost Estimates by Alternative

				Coordinated Transit System		
	Item	Unit of Measure	Unit Price	Unit Quantity	Capital Cost	Operational Cost
	Construction					
	Clearing and Grubbing	Acre	$20,000	-	-	-
	Parking Spaces (Hilly)	Each	$450	-	-	-
	Access Roads	LF	$80	-	-	-
	Retaining Wall	LF	$60	-	-	-
	Drainage Control	Acre	$21,200	-	-	-
	Pedestrian Improvements	LF	$15	-	-	-
	Bus Loading Pads/Benches	Each	$10,000	2	$20,000.00	-
	Striping	LF	$0	-	-	-
	Utilities	LS	$0.30	-	-	-
	Break-A-Way Posts	Each	$64	-	-	-
	Signs (one post)	Each	$240	6	$1,440.00	-
	Signs (two posts)	Each	$400	-	-	-
	Access Control Gates	Each	$1,000	-	-	-
	Radio Transmitters	Each	$20,000	-	-	-
	Rights of Way	Acre		-	-	-
	Transit Shelter	Each	$10,000	-	-	-
	Staffed Control Gate	Each	$30,000	-	-	-
	Pier w/ Docking Ability	Each	$400,000	-	-	-
	TOTAL CONSTRUCTION MATERIAL				$21,440.00	$0.00
	Environmental *		10%	-	$2,144.00	-
	Engineering **		15%	-	$3,216.00	-
	Contingency ***		20%	-	$4,288.00	-
	TOTAL CONSTRUCTION COST				$31,088.00	$0.00
	Transit					
	Trolley Vehicle	Each	$100,000	-	-	-
	Bus Vehicle	Each	$90,000	-	-	-
	Van Vehicle	Each	$50,000	2	$100,000.00	-
	Trolley Operations	$/Hour	$20.00	-	-	-
	Bus Operations	$/Hour	$23.39	-	-	-
	Van Operations	$/Hour	$18.87	2,408	-	$45,438.96
	Annual Transit Costs	$/Vehicle	$3,043	2	-	$6,086.00
	Transit Operator Profits	Hrs & Costs	5%	-	-	$2,576.25
	Transit Operator Fixed Costs	$/Yr	$2,356	1	-	$2,356.00
	Transport Boat	Each	$300,000	-	-	-
	TOTAL TRANSIT COST				$100,000.00	$56,457.21
	Miscellaneous					
	Marketing	$/Yr	Varies	-	-	$10,000.00
	Law Enforcement	$/Hr	$40	-	-	-
	Deputized Parking Enforcer	$/Hr	$25	-	-	-
	Parking Control Vehicles	Each	$20,000	-	-	-
	Program Administration	$/Yr	Varies	-	-	-
	Site Facilities	Each	Varies	-	-	-
	TOTAL MISCELLANEOUS COST				$0.00	$10,000.00
	TOTAL COST				**$131,088.00**	**$66,457.21**
	Revenue Generation					
	# of Vehicles Parking	Amount	Varies	-	-	-
	Parking Space Utilization	%/Day	Varies	-	-	-
	Days Parking Utilized	Days	86	-	-	-
	Parking Fees	$/Space	$5	-	-	-
	Yearly Passengers	Pass/Yr.		7,654	-	-
	% Paying a New Fare (not transferred)	%		50%	-	-
	Shuttle Fare	$/Passenger	$2	-	-	$7,654
	TOTAL REVENUE GENERATION					$7,654
	TOTAL				**$131,088.00**	**$58,803.21**

				Devils Postpile Shuttle		
	Item	Unit of Measure	Unit Price	Unit Quantity	Capital Cost	Operational Cost
	Construction					
	Clearing and Grubbing	Acre	$20,000	0.5	$10,000.00	-
	Parking Spaces (Hilly)	Each	$450	80	$36,000.00	-
	Access Roads	LF	$80	448	$35,840.00	-
	Retaining Wall	LF	$60	614	$36,840.00	-
	Drainage Control	Acre	$21,200	0.5	$10,600.00	-
	Pedestrian Improvements	LF	$15	123	$1,845.00	-
	Bus Loading Pads/Benches	Each	$10,000	6	$60,000.00	-
	Striping	LF	$0	4,000	$0.00	-
	Utilities	LS	$0.30	50	$15.00	-
	Break-A-Way Posts	Each	$64	20	$1,280.00	-
	Signs (one post)	Each	$240	10	$2,400.00	-
	Signs (two posts)	Each	$400	5	$2,000.00	-
	Access Control Gates	Each	$1,000	-	-	-
	Radio Transmitters	Each	$20,000	-	-	-
	Rights of Way	Acre		-	-	-
	Transit Shelter	Each	$10,000	1	$10,000.00	-
	Staffed Control Gate	Each	$30,000	1	$30,000.00	-
	Pier w/ Docking Ability	Each	$400,000	-	-	-
	TOTAL CONSTRUCTION MATERIAL				$236,820.00	$0.00
	Environmental *		10%	-	$23,682.00	-
	Engineering **		15%	-	$35,523.00	-
	Contingency ***		20%	-	$47,364.00	-
	TOTAL CONSTRUCTION COST				$343,389.00	$0.00
	Transit					
	Trolley Vehicle	Each	$100,000	-	-	
	Bus Vehicle	Each	$90,000	2	$180,000.00	
	Van Vehicle	Each	$50,000	1	$50,000.00	
	Trolley Operations	$/Hour	$20.00	-	-	-
	Bus Operations	$/Hour	$23.39	2,408	-	$56,323.12
	Van Operations	$/Hour	$18.87	1,204	-	$22,719.48
	Annual Transit Costs	$/Vehicle	$3,043	3	-	$9,129.00
	Transit Operator Profits	Hrs & Costs	5%	-	-	$4,408.58
	Transit Operator Fixed Costs	$/Yr	$2,356	1	-	$2,356.00
	Transport Boat	Each	$300,000	-	-	-
	TOTAL TRANSIT COST				$230,000.00	$94,936.18
	Miscellaneous					
	Marketing	$/Yr	Varies	-	-	$10,000
	Law Enforcement	$/Hr	$40	-	-	-
	Deputized Parking Enforcer	$/Hr	$25	1376	-	$34,400.00
	Parking Control Vehicles	Each	$20,000	-	-	-
	Program Administration	$/Yr	Varies	-	-	$20,000
	Site Facilities	Each	Varies	-	$5,000.00	-
	TOTAL MISCELLANEOUS COST			-	$5,000.00	$64,400
	TOTAL COST				**$578,389.00**	**$159,336.18**
	Revenue Generation					
	# of Vehicles Parking	Amount	Varies	31	-	-
	Parking Space Utilization	%/Day	Varies	90%	-	-
	Days Parking Utilized	Days	86	86	-	-
	Parking Fees	$/Space	$5	-	-	$11,997
	Yearly Passengers	Pass/Yr.		-	-	-
	% Paying a New Fare (not transferred)	%		-	-	-
	Shuttle Fare	$/Passenger	$2	-	-	-
	TOTAL REVENUE GENERATION					$11,997
	TOTAL				**$578,389.00**	**$147,339.18**

				Parking Control w/Shuttle		
	Item	Unit of Measure	Unit Price	Unit Quantity	Capital Cost	Operational Cost
	Construction					
	Clearing and Grubbing	Acre	$20,000	0.25	$5,000.00	-
	Parking Spaces (Hilly)	Each	$450	40	$18,000.00	-
	Access Roads	LF	$80	224	$17,920.00	-
	Retaining Wall	LF	$60	336	$20,160.00	-
	Drainage Control	Acre	$21,200	0.25	$5,300.00	-
	Pedestrian Improvements	LF	$15	45	$675.00	-
	Bus Loading Pads/Benches	Each	$10,000	6	$60,000.00	-
	Striping	LF	$0	2,000	$0.00	-
	Utilities	LS	$0.30	25	$7.50	-
	Break-A-Way Posts	Each	$64	50	$3,200.00	-
	Signs (one post)	Each	$240	10	$2,400.00	-
	Signs (two posts)	Each	$400	5	$2,000.00	-
	Access Control Gates	Each	$1,000	-	-	-
	Radio Transmitters	Each	$20,000	-	-	-
	Rights of Way	Acre		-	-	-
	Transit Shelter	Each	$10,000	1	$10,000.00	-
	Staffed Control Gate	Each	$30,000	-	-	-
	Pier w/ Docking Ability	Each	$400,000	-	-	-
	TOTAL CONSTRUCTION MATERIAL				$144,662.50	$0.00
	Environmental *		10%	-	$14,466.25	-
	Engineering **		15%	-	$21,699.38	-
	Contingency ***		20%	-	$28,932.50	-
	TOTAL CONSTRUCTION COST				$209,760.63	$0.00
	Transit					
	Trolley Vehicle	Each	$100,000	-	-	
	Bus Vehicle	Each	$90,000	-	-	
	Van Vehicle	Each	$50,000	2	$100,000.00	
	Trolley Operations	$/Hour	$20.00	-	-	-
	Bus Operations	$/Hour	$23.39	-	-	-
	Van Operations	$/Hour	$18.87	2,408	-	$45,438.96
	Annual Transit Costs	$/Vehicle	$3,043	2	-	$6,086.00
	Transit Operator Profits	Hrs & Costs	5%	-	-	$2,576.25
	Transit Operator Fixed Costs	$/Yr	$2,356	1	-	$2,356.00
	Transport Boat	Each	$300,000	-	-	-
	TOTAL TRANSIT COST				$100,000.00	$56,457.21
	Miscellaneous					
	Marketing	$/Yr	Varies	-	-	$10,000
	Law Enforcement	$/Hr	$40	86	-	$3,440.00
	Deputized Parking Enforcer	$/Hr	$25	344	-	$8,600.00
	Parking Control Vehicles	Each	$20,000	1	$20,000.00	-
	Program Administration	$/Yr	Varies	-	-	$20,000
	Site Facilities	Each	Varies	-	-	-
	TOTAL MISCELLANEOUS COST			-	$20,000.00	$42,040
	TOTAL COST				**$329,760.63**	**$98,497.21**
	Revenue Generation					
	# of Vehicles Parking	Amount	Varies	42	-	-
	Parking Space Utilization	%/Day	Varies	95%	-	-
	Days Parking Utilized	Days	86	86	-	-
	Parking Fees	$/Space	$5	-	-	$17,157
	Yearly Passengers	Pass/Yr.		-	-	-
	% Paying a New Fare (not transferred)	%		-	-	-
	Shuttle Fare	$/Passenger	$2	-	-	-
	TOTAL REVENUE GENERATION					$17,157
	TOTAL				**$329,760.63**	**$81,340.21**

				Parking Area at North End		
	Item	Unit of Measure	Unit Price	Unit Quantity	Capital Cost	Operational Cost
	Construction					
	Clearing and Grubbing	Acre	$20,000	0.08	$1,600.00	-
	Parking Spaces (Hilly)	Each	$450	15	$6,750.00	-
	Access Roads	LF	$80	17	$1,360.00	-
	Retaining Wall	LF	$60	35	$2,100.00	-
	Drainage Control	Acre	$21,200	0.08	$1,696.00	-
	Pedestrian Improvements	LF	$15	200	$3,000.00	-
	Bus Loading Pads/Benches	Each	$10,000	-	-	-
	Striping	LF	$0	750	$0.00	-
	Utilities	LS	$0.30	40	$12.00	-
	Break-A-Way Posts	Each	$64	10	$640.00	-
	Signs (one post)	Each	$240	3	$720.00	-
	Signs (two posts)	Each	$400	1	$400.00	-
	Access Control Gates	Each	$1,000	-	-	-
	Radio Transmitters	Each	$20,000	-	-	-
	Rights of Way	Acre		-	-	-
	Transit Shelter	Each	$10,000	-	-	-
	Staffed Control Gate	Each	$30,000	-	-	-
	Pier w/ Docking Ability	Each	$400,000	-	-	-
	TOTAL CONSTRUCTION MATERIAL				$18,278.00	$0.00
	Environmental *		10%	-	$7,311.20	-
	Engineering **		15%	-	$5,483.40	-
	Contingency ***		20%	-	$14,622.40	-
	TOTAL CONSTRUCTION COST				$45,695.00	$0.00
	Transit					
	Trolley Vehicle	Each	$100,000	-	-	
	Bus Vehicle	Each	$90,000	-	-	
	Van Vehicle	Each	$50,000	-	-	
	Trolley Operations	$/Hour	$20.00	-	-	-
	Bus Operations	$/Hour	$23.39	-	-	-
	Van Operations	$/Hour	$18.87	-	-	-
	Annual Transit Costs	$/Vehicle	$3,043	-	-	-
	Transit Operator Profits	Hrs & Costs	5%	-	-	-
	Transit Operator Fixed Costs	$/Yr	$2,356	-	-	-
	Transport Boat	Each	$300,000	-	-	-
	TOTAL TRANSIT COST				$0.00	$0.00
	Miscellaneous					
	Marketing	$/Yr	Varies	-	-	$1,500
	Law Enforcement	$/Hr	$40	43	-	$1,720.00
	Deputized Parking Enforcer	$/Hr	$25	-	-	-
	Parking Control Vehicles	Each	$20,000	-	-	-
	Program Administration	$/Yr	Varies	-	-	-
	Site Facilities	Each	Varies	-	$20,000.00	-
	TOTAL MISCELLANEOUS COST			-	$20,000.00	$3,220
	TOTAL COST				**$65,695.00**	**$3,220.00**
	Revenue Generation					
	# of Vehicles Parking	Amount	Varies	-	-	-
	Parking Space Utilization	%/Day	Varies	-	-	-
	Days Parking Utilized	Days	86	-	-	-
	Parking Fees	$/Space	$5	-	-	-
	Yearly Passengers	Pass/Yr.		-	-	-
	% Paying a New Fare (not transferred)	%		-	-	-
	Shuttle Fare	$/Passenger	$2	-	-	-
	TOTAL REVENUE GENERATION					$0
	TOTAL				**$65,695.00**	**$3,220.00**

				Parking Prohibition w/ Shuttle		
	Item	Unit of Measure	Unit Price	Unit Quantity	Capital Cost	Operational Cost
	Construction					
	Clearing and Grubbing	Acre	$20,000	0.95	$19,000.00	-
	Parking Spaces (Hilly)	Each	$450	150	$67,500.00	-
	Access Roads	LF	$80	450	$36,000.00	-
	Retaining Wall	LF	$60	750	$45,000.00	-
	Drainage Control	Acre	$21,200	0.95	$20,140.00	-
	Pedestrian Improvements	LF	$15	160	$2,400.00	-
	Bus Loading Pads/Benches	Each	$10,000	12	$120,000.00	-
	Striping	LF	$0	6,000	$0.00	-
	Utilities	LS	$0.30	90	$27.00	-
	Break-A-Way Posts	Each	$64	50	$3,200.00	-
	Signs (one post)	Each	$240	10	$2,400.00	-
	Signs (two posts)	Each	$400	6	$2,400.00	-
	Access Control Gates	Each	$1,000	-	-	-
	Radio Transmitters	Each	$20,000	-	-	-
	Rights of Way	Acre		-	-	-
	Transit Shelter	Each	$10,000	2	$20,000.00	-
	Staffed Control Gate	Each	$30,000	-	-	-
	Pier w/ Docking Ability	Each	$400,000	-	-	-
	TOTAL CONSTRUCTION MATERIAL				$338,067.00	$0.00
	Environmental *		10%	-	$33,806.70	-
	Engineering **		15%	-	$50,710.05	-
	Contingency ***		20%	-	$67,613.40	-
	TOTAL CONSTRUCTION COST				$490,197.15	$0.00
	Transit					
	Trolley Vehicle	Each	$100,000	3	$300,000.00	
	Bus Vehicle	Each	$90,000	-	-	
	Van Vehicle	Each	$50,000	-	-	
	Trolley Operations	$/Hour	$20.00	3,612	-	$72,240.00
	Bus Operations	$/Hour	$23.39	-	-	-
	Van Operations	$/Hour	$18.87	-	-	-
	Annual Transit Costs	$/Vehicle	$3,043	3	-	$9,129.00
	Transit Operator Profits	Hrs & Costs	5%	-	-	$4,068.45
	Transit Operator Fixed Costs	$/Yr	$2,356	1	-	$2,356.00
	Transport Boat	Each	$300,000	-	-	-
	TOTAL TRANSIT COST				$300,000.00	$87,793.45
	Miscellaneous					
	Marketing	$/Yr	Varies	-	-	$15,000
	Law Enforcement	$/Hr	$40	86	-	$3,440.00
	Deputized Parking Enforcer	$/Hr	$25	344	-	$8,600.00
	Parking Control Vehicles	Each	$20,000	1	$20,000.00	-
	Program Administration	$/Yr	Varies	-	-	$20,000
	Site Facilities	Each	Varies	-	-	-
	TOTAL MISCELLANEOUS COST			-	$20,000.00	$47,040
	TOTAL COST				**$810,197.15**	**$134,833.45**
	Revenue Generation					
	# of Vehicles Parking	Amount	Varies	-	-	-
	Parking Space Utilization	%/Day	Varies	-	-	-
	Days Parking Utilized	Days	86	-	-	-
	Parking Fees	$/Space	$5	-	-	-
	Yearly Passengers	Pass/Yr.		-	-	-
	% Paying a New Fare (not transferred)	%		-	-	-
	Shuttle Fare	$/Passenger	$2	-	-	-
	TOTAL REVENUE GENERATION					$0
	TOTAL				**$810,197.15**	**$134,833.45**

				North End Parking & Water Taxi		
	Item	Unit of Measure	Unit Price	Unit Quantity	Capital Cost	Operational Cost
	Construction					
	Clearing and Grubbing	Acre	$20,000	0.5	$10,000.00	-
	Parking Spaces (Hilly)	Each	$450	80	$36,000.00	-
	Access Roads	LF	$80	448	$35,840.00	-
	Retaining Wall	LF	$60	614	$36,840.00	-
	Drainage Control	Acre	$21,200	0.5	$10,600.00	-
	Pedestrian Improvements	LF	$15	400	$6,000.00	-
	Bus Loading Pads/Benches	Each	$10,000	2	$20,000.00	-
	Striping	LF	$0	4,000	$0.00	-
	Utilities	LS	$0.30	120	$36.00	-
	Break-A-Way Posts	Each	$64	10	$640.00	-
	Signs (one post)	Each	$240	6	$1,440.00	-
	Signs (two posts)	Each	$400	2	$800.00	-
	Access Control Gates	Each	$1,000	-	-	-
	Radio Transmitters	Each	$20,000	-	-	-
	Rights of Way	Acre		-	-	-
	Transit Shelter	Each	$10,000	-	-	-
	Staffed Control Gate	Each	$30,000	-	-	-
	Pier w/ Docking Ability	Each	$400,000	1	$400,000.00	-
	TOTAL CONSTRUCTION MATERIAL				$558,196.00	$0.00
	Environmental *		10%	-	$111,639.20	-
	Engineering **		15%	-	$167,458.80	-
	Contingency ***		20%	-	$111,639.20	-
	TOTAL CONSTRUCTION COST				$948,933.20	$0.00
	Transit					
	Trolley Vehicle	Each	$100,000	-	-	
	Bus Vehicle	Each	$90,000	-	-	
	Van Vehicle	Each	$50,000	1	$50,000.00	
	Trolley Operations	$/Hour	$20.00	-	-	-
	Bus Operations	$/Hour	$23.39	1,204	-	$28,161.56
	Van Operations	$/Hour	$18.87	1,204	-	$22,719.48
	Annual Transit Costs	$/Vehicle	$3,043	1	-	$3,043.00
	Transit Operator Profits	Hrs & Costs	5%	-	-	$2,696.20
	Transit Operator Fixed Costs	$/Yr	$2,356	1	-	$2,356.00
	Transport Boat	Each	$300,000	1	$300,000.00	-
	TOTAL TRANSIT COST				$350,000.00	$58,976.24
	Miscellaneous					
	Marketing	$/Yr	Varies	-	-	$15,000
	Law Enforcement	$/Hr	$40	86	-	$3,440.00
	Deputized Parking Enforcer	$/Hr	$25	344	-	$8,600.00
	Parking Control Vehicles	Each	$20,000	1	$20,000.00	-
	Program Administration	$/Yr	Varies	-	-	$20,000
	Site Facilities	Each	Varies	-	-	-
	TOTAL MISCELLANEOUS COST			-	$20,000.00	$47,040
	TOTAL COST				**$1,318,933.20**	**$106,016.24**
	Revenue Generation					
	# of Vehicles Parking	Amount	Varies	-	-	-
	Parking Space Utilization	%/Day	Varies	-	-	-
	Days Parking Utilized	Days	86	-	-	-
	Parking Fees	$/Space	$5	-	-	-
	Yearly Passengers	Pass/Yr.		28,294	-	-
	% Paying a New Fare (not transferred)	%		100%	-	-
	Shuttle Fare	$/Passenger	$2	-	-	$56,588
	TOTAL REVENUE GENERATION					$56,588
	TOTAL				**$1,318,933.20**	**$49,428.24**

	Item	Unit of Measure	Unit Price	"Rules of the Road" Unit Quantity	Capital Cost	Operational Cost
	Construction					
	Clearing and Grubbing	Acre	$20,000	-	-	-
	Parking Spaces (Hilly)	Each	$450	-	-	-
	Access Roads	LF	$80	-	-	-
	Retaining Wall	LF	$60	-	-	-
	Drainage Control	Acre	$21,200	-	-	-
	Pedestrian Improvements	LF	$15	-	-	-
	Bus Loading Pads/Benches	Each	$10,000	-	-	-
	Striping	LF	$0	-	-	-
	Utilities	LS	$0.30	-	-	-
	Break-A-Way Posts	Each	$64	-	-	-
	Signs (one post)	Each	$240	10	$2,400.00	-
	Signs (two posts)	Each	$400	6	$2,400.00	-
	Access Control Gates	Each	$1,000	-	-	-
	Radio Transmitters	Each	$20,000	-	-	-
	Rights of Way	Acre		-	-	-
	Transit Shelter	Each	$10,000	-	-	-
	Staffed Control Gate	Each	$30,000	-	-	-
	Pier w/ Docking Ability	Each	$400,000	-	-	-
	TOTAL CONSTRUCTION MATERIAL				$4,800.00	$0.00
	Environmental *		10%	-	$480.00	-
	Engineering **		15%	-	$720.00	-
	Contingency ***		20%	-	$960.00	-
	TOTAL CONSTRUCTION COST				$6,960.00	$0.00
	Transit					
	Trolley Vehicle	Each	$100,000	-	-	-
	Bus Vehicle	Each	$90,000	-	-	-
	Van Vehicle	Each	$50,000	-	-	-
	Trolley Operations	$/Hour	$20.00	-	-	-
	Bus Operations	$/Hour	$23.39	-	-	-
	Van Operations	$/Hour	$18.87	-	-	-
	Annual Transit Costs	$/Vehicle	$3,043	-	-	-
	Transit Operator Profits	Hrs & Costs	5%	-	-	-
	Transit Operator Fixed Costs	$/Yr	$2,356	-	-	-
	Transport Boat	Each	$300,000	-	-	-
	TOTAL TRANSIT COST				$0.00	$0.00
	Miscellaneous					
	Marketing	$/Yr	Varies	-	-	-
	Law Enforcement	$/Hr	$40	86	-	$3,440.00
	Deputized Parking Enforcer	$/Hr	$25	-	-	-
	Parking Control Vehicles	Each	$20,000	-	-	-
	Program Administration	$/Yr	Varies	-	-	-
	Site Facilities	Each	Varies	-	-	-
	TOTAL MISCELLANEOUS COST			-	$0.00	$3,440
	TOTAL COST				**$6,960.00**	**$3,440.00**
	Revenue Generation					
	# of Vehicles Parking	Amount	Varies	-	-	-
	Parking Space Utilization	%/Day	Varies	-	-	-
	Days Parking Utilized	Days	86	-	-	-
	Parking Fees	$/Space	$5	-	-	-
	Yearly Passengers	Pass/Yr.		-	-	-
	% Paying a New Fare (not transferred)	%		-	-	-
	Shuttle Fare	$/Passenger	$2	-	-	-
	TOTAL REVENUE GENERATION					$0
	TOTAL				**$6,960.00**	**$3,440.00**

				Increase Emerald Bay Shuttle		
	Item	Unit of Measure	Unit Price	Unit Quantity	Capital Cost	Operational Cost
	Construction					
	Clearing and Grubbing	Acre	$20,000	-	-	-
	Parking Spaces (Hilly)	Each	$450	-	-	-
	Access Roads	LF	$80	-	-	-
	Retaining Wall	LF	$60	-	-	-
	Drainage Control	Acre	$21,200	-	-	-
	Pedestrian Improvements	LF	$15	-	-	-
	Bus Loading Pads/Benches	Each	$10,000	5	$50,000.00	-
	Striping	LF	$0	-	-	-
	Utilities	LS	$0.30	-	-	-
	Break-A-Way Posts	Each	$64	-	-	-
	Signs (one post)	Each	$240	5	$1,200.00	-
	Signs (two posts)	Each	$400	2	$800.00	-
	Access Control Gates	Each	$1,000	-	-	-
	Radio Transmitters	Each	$20,000	-	-	-
	Rights of Way	Acre		-	-	-
	Transit Shelter	Each	$10,000	-	-	-
	Staffed Control Gate	Each	$30,000	-	-	-
	Pier w/ Docking Ability	Each	$400,000	-	-	-
	TOTAL CONSTRUCTION MATERIAL				$52,000.00	$0.00
	Environmental *		10%	-	$5,200.00	-
	Engineering **		15%	-	$7,800.00	-
	Contingency ***		20%	-	$10,400.00	-
	TOTAL CONSTRUCTION COST				$75,400.00	$0.00
	Transit					
	Trolley Vehicle	Each	$100,000	2	$200,000.00	-
	Bus Vehicle	Each	$90,000	-	-	-
	Van Vehicle	Each	$50,000	-	-	-
	Trolley Operations	$/Hour	$20.00	2,408	-	$48,160.00
	Bus Operations	$/Hour	$23.39	-	-	-
	Van Operations	$/Hour	$18.87	-	-	-
	Annual Transit Costs	$/Vehicle	$3,043	2	-	$6,086.00
	Transit Operator Profits	Hrs & Costs	5%	-	-	$2,712.30
	Transit Operator Fixed Costs	$/Yr	$2,356	1	-	$2,356.00
	Transport Boat	Each	$300,000	-	-	-
	TOTAL TRANSIT COST				$200,000.00	$59,314.30
	Miscellaneous					
	Marketing	$/Yr	Varies	-	-	$5,000
	Law Enforcement	$/Hr	$40	-	-	-
	Deputized Parking Enforcer	$/Hr	$25	-	-	-
	Parking Control Vehicles	Each	$20,000	-	-	-
	Program Administration	$/Yr	Varies	-	-	-
	Site Facilities	Each	Varies	-	-	-
	TOTAL MISCELLANEOUS COST			-	$0.00	$5,000
	TOTAL COST				**$275,400.00**	**$64,314.30**
	Revenue Generation					
	# of Vehicles Parking	Amount	Varies	-	-	-
	Parking Space Utilization	%/Day	Varies	-	-	-
	Days Parking Utilized	Days	86	-	-	-
	Parking Fees	$/Space	$5	-	-	-
	Yearly Passengers	Pass/Yr.		6,966	-	-
	% Paying a New Fare (not transferred)	%		100%	-	-
	Shuttle Fare	$/Passenger	$2	-	-	$13,932
	TOTAL REVENUE GENERATION					$13,932
	TOTAL				**$275,400.00**	**$50,382.30**

				Parking Management w/ Shuttle		
	Item	Unit of Measure	Unit Price	Unit Quantity	Capital Cost	Operational Cost
	Construction					
	Clearing and Grubbing	Acre	$20,000	1	$20,000.00	-
	Parking Spaces (Hilly)	Each	$450	169	$76,050.00	-
	Access Roads	LF	$80	200	$16,000.00	-
	Retaining Wall	LF	$60	1,100	$66,000.00	-
	Drainage Control	Acre	$21,200	1	$21,200.00	-
	Pedestrian Improvements	LF	$15	200	$3,000.00	-
	Bus Loading Pads/Benches	Each	$10,000	8	$80,000.00	-
	Striping	LF	$0	8,450	$0.00	-
	Utilities	LS	$0.30	60	$18.00	-
	Break-A-Way Posts	Each	$64	60	$3,840.00	-
	Signs (one post)	Each	$240	14	$3,360.00	-
	Signs (two posts)	Each	$400	4	$1,600.00	-
	Access Control Gates	Each	$1,000	-	-	-
	Radio Transmitters	Each	$20,000	-	-	-
	Rights of Way	Acre		-	-	-
	Transit Shelter	Each	$10,000	3	$30,000.00	-
	Staffed Control Gate	Each	$30,000	-	-	-
	Pier w/ Docking Ability	Each	$400,000	-	-	-
	TOTAL CONSTRUCTION MATERIAL				$321,068.00	$0.00
	Environmental *		10%	-	$32,106.80	-
	Engineering **		15%	-	$48,160.20	-
	Contingency ***		20%	-	$64,213.60	-
	TOTAL CONSTRUCTION COST				$465,548.60	$0.00
	Transit					
	Trolley Vehicle	Each	$100,000	2	$200,000.00	-
	Bus Vehicle	Each	$90,000	-	-	-
	Van Vehicle	Each	$50,000	-	-	-
	Trolley Operations	$/Hour	$20.00	2,408	-	$48,160.00
	Bus Operations	$/Hour	$23.39	-	-	-
	Van Operations	$/Hour	$18.87	-	-	-
	Annual Transit Costs	$/Vehicle	$3,043	2	-	$6,086.00
	Transit Operator Profits	Hrs & Costs	5%	-	-	$2,712.30
	Transit Operator Fixed Costs	$/Yr	$2,356	1	-	$2,356.00
	Transport Boat	Each	$300,000	-	-	-
	TOTAL TRANSIT COST				$200,000.00	$59,314.30
	Miscellaneous					
	Marketing	$/Yr	Varies	-	-	$10,000
	Law Enforcement	$/Hr	$40	86	-	$3,440.00
	Deputized Parking Enforcer	$/Hr	$25	344	-	$8,600.00
	Parking Control Vehicles	Each	$20,000	1	$20,000.00	-
	Program Administration	$/Yr	Varies	-	-	$20,000
	Site Facilities	Each	Varies	-	-	-
	TOTAL MISCELLANEOUS COST			-	$20,000.00	$42,040
	TOTAL COST				**$685,548.60**	**$101,354.30**
	Revenue Generation					
	# of Vehicles Parking	Amount	Varies	143	-	-
	Parking Space Utilization	%/Day	Varies	150%	-	-
	Days Parking Utilized	Days	86	86	-	-
	Parking Fees	$/Space	$5	-	-	$92,235
	Yearly Passengers	Pass/Yr.		-	-	-
	% Paying a New Fare (not transferred)	%		-	-	-
	Shuttle Fare	$/Passenger	$2	-	-	-
	TOTAL REVENUE GENERATION					$92,235
	TOTAL				**$685,548.60**	**$9,119.30**

[i] Reconnaissance and Scoping Report, California Forest Highway 223 Fallen Leaf Road, Lake Tahoe Basin Management Unit, El Dorado County, Federal Highway Administration Central Federal Lands Highway Division, Denver, Colorado, December, 1993.

[ii] Various written correspondences regarding Fallen Leaf Lake, assembled by Lyn Barnett, Tahoe Regional Planning Agency, 1993 through 1997.

[iii] Draft TRPA Regional Transportation Plan/Air Quality Plan, 1998